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From a photograph of the model in the Transportation Building, St. Louis. This vast hall will measure 85 feet in width by 300 feet in length by 150 feet in clear height.

MAIN ROTUNDA OF THE NEW PENNSYLVANIA STATION, NEW YORK CITY.—[See page 246.]

SCIENTIFIC AMERICAN

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NEW YORK, SATURDAY, OCTOBER 8, 1904.

The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are sharp, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

THAT RAMAPO SCHEME AGAIN.

The famous, or rather infamous, Ramapo scheme, by which a private corporation sought, during the Van Wyck regime, to control the sources of New York city's future water supply, was only defeated after most earnest efforts on the part of the Merchants' Association of this city, backed by the better and more enlightened element among the citizens. The scheme originated during the last Tammany administration, and received the most energetic indorsement of a large portion of the municipal administration of that time. After the Ramapo company had bought up all the sources of water supply that were contemplated in the scheme, and the options on the same were safely stowed away, the details of the plan were made public, and an effort was made to secure legislative sanction. Had the matter gone through, this great and growing city would have been subject to one of the most daring monopolies of a public necessity on record, while the sponsors of the scheme would have reaped enormous personal profits. Happily, the determined stand which was taken against the measure proved successful, and the bill authorizing the scheme was defeated. At the same time, proper steps, in the way of appointing an expert engineering commission, were promptly taken, and after a most exhaustive investigation, a comprehensive report was presented, and a scheme of future water supply, based not upon considerations of the gain of private individuals, but upon the highest regard for the necessities and future welfare of the city, was drawn up.

With the change of administration the Ramapo company saw an opportunity to set their machinery once more in motion with some considerable hope of success, and the evidence of this is seen in the recent appointment as Chief Engineer of the Water Supply Department of a man who was strongly in favor of the Ramapo scheme at the time of its first agitation. The new appointee, ignoring absolutely the careful report made by the expert commission above referred to, now announces that he has a ninety million dollar proposal for providing New York city with an adequate water supply—a proposal, by the way, which is virtually a rehabilitation of the Ramapo plans. Obviously, the better element in New York city must be prepared to fight the old battle over again. The task is, no doubt, distasteful and wearisome; but it is a public duty which is urgent upon everyone that has the best interests of the city at heart.

THE LAUNCHING WEIGHT OF THE "CONNECTICUT."

Considering the general excellence of the accounts given in the daily press of the launching of the "Connecticut," it is surprising that, one and all, they should have fallen into the error of speaking of the battleship as weighing, when she made her initial plunge into the water, some 16,500 tons, whereas, as a matter of fact, she did not weigh within 9,500 tons of that amount. Her actual launching weight was only 6,999 tons. The oft-quoted 16,500 tons is the displacement, or actual weight, of the ship in her completed condition, with ammunition and all kinds of stores aboard, and 900 tons of coal in her bunkers. So that in point of weight, the "Connecticut" that swept down the ways on the 29th of September was a very different "Connecticut" from the one that some eighteen months from now will hoist her flag, completely equipped and ready to take her place, if need be, in line of battle. Out of the water and on the ways the battleship looked larger than she ever will again; for the spectator viewed the whole mass of the vessel from keel to superstructure deck. The 26 feet of hull that from now on will be submerged beneath the water was visible, and helped to give that predominant impression of bulk and weight, which was so much the object of remark among the thousands who witnessed the launching. The "Connecticut," however, was not by any means so heavy as she looked, being in fact but the mere shell of the ship, including the double bottom, the framing, the skin plating, and the various steel decks. From now on as she sits in the water she will take on weight very rapidly, that is, provided the armor-plate makers deal fairly by the ship, and make no discrimination in delivery of armor plate in favor of the contract-built sister vessel at Newport News. We speak advisedly here; for shipments of armor are finding their way to the southern shipyard with much greater alacrity than they are to the yard where the government-built ship is in hand. By the time that the armor plating has been put in place along the waterline, and over the central broadside batteries, upon the turrets, casemates, and on the conning towers, some 4,000 tons of weight will have been added, bringing the total displacement of the ship up to about 11,000 tons. The other 5,500 tons will be made up of the large battery of boilers, the two main twin-screw engines, the various auxiliary engines, the thousand-and-one furnishings and fittings that enter into a ship of this size and importance, and finally the enormous amount of coal and stores that must be carried.

Long before the date of launching the "Connecticut," the naval constructors had made an accurate estimate of the rate at which she would gather headway in sliding down the ways, the speed at which she would enter the water, and the distance to which she would travel by her own momentum after she was fairly afloat. The acceleration was very rapid, much more so than the layman who witnessed the launch would suppose, for the great bulk of the vessel made her appear to be moving more slowly than she actually was. As a matter of fact, the velocity rose to about 15 knots an hour, or within 3 knots of the highest speed which the vessel is designed to make under full horse-power.

THE MENACE OF THE PULLMAN CAR.

The frightful epidemic of railroad disasters which is upon us just now, has brought the question to the Editor's desk as to what, in the wrecked train itself, is the most fruitful cause of fatalities. After several years' careful study of this question, we do not hesitate to say that in head-on collisions, where the wrecked train is made up of light day coaches and massive Pullman cars, it is the Pullmans that are chiefly responsible for the maiming and killing. In saying this, we are not forgetful that a few months ago we commented editorially on the fact that the Pullman Company have been able to boast of an extraordinarily small list of fatalities to Pullman passengers, during a period that had been more than usually fruitful in railroad disasters; for it is the very element of weight and strength in the Pullman cars that renders them at once a protection to those who travel in them and a menace to those who do not, but take passage in the more lightly-constructed day coaches that are so frequently interposed between the engine and the Pullman cars. This remark, it must be understood, applies only to the case of head-on collisions. In the case of rear collisions, the Pullman cars are just as much a protection to the day coaches as they are a menace in head-on collisions; for in rear collisions the inertia of the Pullmans serves to absorb a large amount of the energy of the colliding train, although their enormous stiffness makes it certain that the residue of the striking energy will be transmitted in full to the day coaches ahead. The truth of these remarks was amply verified in the descriptions of the recent horrible accident on the Southern Railroad, where practically all the fatalities occurred in a train that was made up of day coaches and Pullmans, the Pullmans expending their energy in crumpling up the day coaches ahead of them, with a resulting loss of life that made this accident one of the most fatal on record. The experience on the Southern Railroad teaches nothing new. In fact, in reading the descriptions of any of the recent accidents, one is struck with the fact of their similarity in respect to the behavior of the Pullman car. The press dispatches almost invariably contain the customary note to the effect that the Pullman cars did not leave the track, and that although they were badly shaken up, the passengers received no serious injury. The only exception to this was the accident in which the Pullman cars broke away from the rest of the train, jumped the tracks, and swung over onto the opposite tracks a few moments before the passing of an overdue freight train, which struck the Pullman cars and wrecked them.

The question arises as to what is the proper way to even up the chances of safety for the railroad traveler, rendering day-coach travel less dangerous without sacrificing the security of the Pullman passenger. In answering this question, it must first be admitted that the Pullman car is unreasonably heavy. By the judicious use of steel construction, equal strength could be obtained with a considerable reduction of weight. On the other hand, the admirable steel day coaches, which have been built for the Illinois Central Railroad, prove that the strength of the passenger car can be greatly increased without adding materially to its weight. Obviously, the wisest course to adopt—we do not say the most humane, for considerations of humanity seem to have but little place in determining the problems of railroad travel—would be to build all passenger equipment entirely of steel. We would then have collision-proof trains; and although the shock of collision would still be present, the disastrous telescoping with its attendant horrors would be a thing of the past, and the Pullman passenger would no longer obtain his greater security at the peril of the other passengers on the train.

We take this opportunity to reply to the question that has frequently been asked by correspondents, as to what is the safest part of the train for a passenger. In answer we have to say that for any kind of collision or derailment, the Pullman passenger is least exposed to injury; but in trains made up of homogeneous day coaches, such as are in use in suburban service, in a head-on collision, the last car is, of course, the least exposed to injury, and in rear collisions the first car. A consideration of the average accidents of railroad travel, therefore, will suggest that the passenger who is anxious for the safety of his person will run the least risk of injury if he seats himself a little forward of the center of the train.

CURIOUS FOODS.

Among civilized nations the variety of tastes attracts but little attention. The vegetarians and the meat eaters each have their followers, and a recent school advocates less food and fewer meals, while there are countless fads for the delectation of the hungry.

That civilized man has missed some of the most toothsome dainties goes without saying, and it is evident that prejudice enters very largely into this. Thus, in California, the best fish it is said is the sculpin, but in the East this fish goes begging on account of its disagreeable appearance. In Arizona Indian children may be seen catching ants and eating them; and in Mexico the honey ant is eagerly sought after by the natives, who eat the well-rounded, currant-like abdomen. In South America the large lizard, the iguana, is a delicacy, not to speak of the larger snakes which in taste are like chicken. The ordinary rattle-snake, it is said, is very good eating if one can overcome the inborn prejudice.

Americans are inclined to regard the Chinese as a race of rat eaters and denounce the animal as unclean, at the same time consuming tons yearly of the most loathsome of all animals—the hog. The rat is careful of its toilet, cleaning itself constantly; but the hog is the only animal of so-called intelligence that revels in filth and prefers it to cleanliness. The common skunk, owing to its peculiar and offensive glands, will never be popular as food, yet its flesh is not only good, but delicious, according to various connoisseurs who have eaten it.

That insects do not enter more into the food supplies of nations is due to prejudice. Grasshoppers are eaten by some Western tribes. Ground up, they make a meal that is said to be both nourishing and agreeable. Many a white man has pressed through a country, believing himself nearly starving as large game was not to be had, when worms and various insects were at hand. During the flight of locusts Indians sometimes collect them in bags, wash them, and cook them for a meal.

The most singular food, in all probability, is the larvæ of a fly, common in certain portions of California and known as *Ephydra*. This insect is found in such vast quantities in Lake Mono, California, that it is washed upon the shores in vast windrows and can be collected by bushels. The water of Mono is very singular, seemingly very heavy and smooth like oil; so much so that it resists ordinary wind and refuses to become ruffled. When the larvæ begin to appear, the Indians gather from far and near and scrape them up, place the worm-like creatures on cloths and racks in the sun and dry them, when they are beaten up and husked, looking then like rice. The Indians call the food koo-chah-bee, and many bushels are collected at this time; that larvæ is nutritious is shown by the condition of the Indians, who soon grow fat on the rich diet. Many birds are attracted by the larvæ and gorge themselves with the singular food.

On Lake Texcoco in Mexico a curious fly is found which also is eaten by the natives and known as ahuatl; the eggs of the insect, which are deposited on sedges, are also collected and eaten for food. On Lake Chalco a certain sedge is cultivated on which the eggs of a species of fly are deposited. Bundles are made of these and placed in Lake Texcoco for the purpose, and, when covered, the sedge is beaten over pieces of cloth and the eggs secured. These are collected and ground into a meal, also called ahuatl, and are in great demand on fast days when fish is required, the insects or eggs not being considered flesh as they come from the water. The food is made into small cakes and tastes not unlike caviare. Not only the eggs, but the larvæ, themselves a disagreeable-looking worm, are used as food under the name of puxi.

The civilized man perhaps turns from such food with disgust, but it is well to remember that epicures in many countries, and especially in England and Amer-

ica, are particularly fond of cheese when inhabited by the larvæ of a very common fly. In the United States the large octopus or squid, common on the Pacific coast, offends the American palate, but the Italian, Frenchman or Portuguese eats it with avidity and considers it a delicacy. The meat is clear and white like chicken and has the flavor of crab.

The question of national tastes is an interesting one, and the contrast between those of China and America is remarkable. The objects displayed in the Chinese quarter as dainties are often repugnant to Americans. We find the Chinaman selling eggs of unknown age, especially ducks' egggs containing ducklings ready to be hatched. Shark fins—a tough, disagreeable food—are in demand, while deer horns in the velvet and lizards of various kinds are eaten. The nest of the swallow, with its embedded secretion of the mouth glands of the bird, is nearly worth its weight in gold. Trepang, the tough, impossible holothurian, is eaten, and its collection is an important industry along the Malay coast, valued at at least $100,000 per annum.

In France the sea anemone is used as food; stuffed like peppers and boiled it calls to mind crab or crayfish. The echini of various species is also used, cooked in the shell, like an egg, and eaten with a spoon. In nearly all the old countries of Europe of the type of Spain and Italy, the poor are so poor that everything in the nature of food is utilized. Absolutely nothing is wasted and meat is rare. The writer recalls the surprise of an Italian fisherman who landed in California after a trip around the Horn, and was amazed, not at the country, but with the abundance of food. He found his countrymen eating meat twice, perhaps three times a day, when he rarely had it once a month. He saw hundreds of pounds of fish wasted, and discarded merely because the people did not care for it, when in Italy even the heads would be boiled and eaten. He saw big tunnies towed out to sea and thrown away because they were tough, when in his own land every scrap of this fish was saved. America was indeed the land of plenty to the poor of other nations.

Certain Indians consider earth worms a dainty. They are dried and rolled together into a peculiar flour. In Bahama and some of the Florida keys the conch is eaten—by far the toughest food known; more like India rubber than anything else, having to be beaten and pounded before it can be masticated or even cooked.

ODDITIES IN SELF-DEFENSE.

By Ernest Ingersoll.

A certain page of my notebook contains a lot of interesting memoranda on the way in which certain small and feeble creatures are guarded against their enemies, or guard themselves, by wearing overcoats of spiny, fuzzy, or rather disagreeable textures, or by having the power to throw out from the skin, or from a special reservoir, some offensive moisture or odor.

Thus extraordinary miniatures of the skunk are found in the small, brilliantly-colored ground beetles called by the French *bombardiers*. A typical species, common in Louisiana, when pursued by its special enemy, the fierce *Calosoma*, a much larger beetle, seems at first to have no chance for escape; but suddenly a popping explosion is heard, and a blue smoke, attended by a rancid smell, is seen to proceed from the hinder extremity of the body, which immediately stops the progress of its assailant. Should the calosoma recover from this and renew the pursuit, a second volley again arrests its course. The bombardier can fire its artillery twenty times, if necessary, and so protect its retreat, and in most cases make sure of an escape.

Not far removed from this, in classification, is the scorpion-fly (*Panorpa*), which, in spite of the formidable-looking forceps at the tip of the abdomen, would be quite harmless were it not that it carries a long gun—the Kentucky rifle of the insect hosts. When it is disturbed, this pretty fly darts out a slender tube, takes aim at the disturber, and lets fly a drop of yellow, malodorous fluid, which will send most, if not all, of its enemies to the right-about. Many true bugs, especially those of the aquatic group Heteroptera, emit an annoying spray, as also does the larva of the saw-fly. The vile odor of the cockroach and one or two other household pests are other too familiar examples of a long list of bugs provided with this disgusting property as a means of protection against their natural enemies, that is, enemies other than man; for here, as so often elsewhere in nature, provisions and habits and instincts, highly serviceable in all other relations, may be a source of danger and harm to an animal when it comes in contact with mankind. The brutes, large and small, are disposed to avoid bad-smelling bugs, but man often seeks them on purpose to put an end to the nuisance by killing its source. This is very different from the accidental death which many such an insect has suffered in spite of its protection, under the tread, or in the careless, browsing jaws, of some creature perhaps a thousand times as large as itself, for it is a direct turning against it of its own trusted method of defense.

Many insects smell decidedly of certain herbs, and sometimes this is pleasant to our nostrils, though evidently disagreeable to others, just as mosquitoes disagree with us in respect to the aromatic pennyroyal. Insect odors are the product of essential oils; and the secretion exudes so plentifully from the joints in the family of oil-beetles, and is so corrosive, that it can be used in medicine as a substitute for the evil-smelling cantharides in making blistering preparations. Is it not fair to suppose that when an animal detects the odor of these corrosive insects, it avoids them for fear of their burning taste and that thus many oil-beetles are saved from an accidental as well as from intentional destruction? And as a further measure of safety, most of them are conspicuously colored, as though for the express purpose of advertising their harmfulness, just as we hoist a red or yellow flag over the door of a house where there is contagious disease.

This endowment is widely distributed and powerful among insects. The ladybird, for instance, has been recommended for the toothache, because its secretion furnishes a powerful counter-irritant; and in colonial times in New Orleans, says Von Reizenstein, the disgusting darkling beetle (*Blaps*) was in vogue as "an old woman's remedy" for chronic ulcers, when applied with cypress oil.

Here, as elsewhere, the kind of foes against which insects guard themselves must be considered, and, as has been said, man must be left out of account. The principal enemies of insects are other insects, birds, and some small mammals. A whole order of mammals, the Insectivores, subsists altogether upon them, and these seem irresistible; but the higher mammals will often refuse certain kinds. On the other hand, dogs seem furious to put to death certain evil-smelling ones, as cockroaches, without wanting to eat them, so here the odor defensive against most foes excites the destructive enmity of a few highly powerful ones.

Turning to the other extreme, the various fuzzy or malodorous exudations of caterpillars and other larvæ are often meant to repel parasites, such as ichneumons, etc.—a matter of the highest importance in insect life.

Birds destroy a vast number of insects, but it is unquestionable that large numbers are quite uneatable by birds, and safe from them, though highly colored and slow of flight, because of the nauseous odors or fluids that impregnate their bodies. The very common frittilaries are good examples among conspicuous butterflies; and more than a thousand species of three tropical families, Heliconids, Danaids, and Acræids, are thus protected, as also are millipeds and many other forms.

Speaking of this matter, Alfred Russell Wallace says that specimens of heliconid butterflies captured in South America by himself and Mr. Bates were less subject to vermin than those of other families, and were not attacked by insect-eating birds or dragon-flies. Although they swarmed in the forests, flying slowly and gaudily, the birds passed them in a chase after far swifter insects.

Thomas Belt's tame monkey in Nicaragua, which would greedily munch up other butterflies, would not eat heliconids. Similar testimony comes from India; and a series of experiments in an aviary, and with frogs and lizards, showed a numerous list of caterpillars that none of these animals would devour, spitting them out with every sign of disgust and of smarting when one was forced into the mouth.

An important reason why certain noxious "worms" (foliage-eating larvæ of moths) are so difficult to subdue is that most of them are covered with bristly hairs, and are not liked by most birds, apparently on that account. It is true that the list of birds which will eat the hairy caterpillars of the tent-worm, the gypsy-moth, and other like pests, has been increased by closer observation of late (though some will eat nothing but the soft inner parts), yet as a rule birds avoid these for the smooth sorts, that have no hairs to prick their throats and irritate their digestive organs. The spiny protection enjoyed by many fishes and shellfish gives material for another essay.

Nearly under this head comes the exudation of slime with which some of the lower animals cover themselves. Snails appear to have no other means of repelling an enemy that may catch them out of hiding, and the naked slugs in particular exude a white mucus over their whole skin, the viscid consistency of which, clinging to a bird's beak or a hairy animal's lips, would seem to be disagreeable enough, apart from any bad taste, to make everything leave the creature alone; as a matter of fact, slugs are eaten mainly by carnivorous members of their own race, and by some reptiles. They are safe, as a rule, from birds and mammals.

A gigantic galley-worm, or myriapod of the tropics (*Peripatus*), offers a remarkable example of this repulsive armament; for when annoyed it ejects from gland openings near the mouth quantities of a sticky, tenacious fluid that forms into a network of threads about its head. An animal whose feathers or whiskers had once become entangled by this natural bird-lime would be very careful to avoid a second experience. That it takes a very small amount of such experience to teach young animals to recognize and let alone things they have found distasteful, is known to everybody who has watched young chicks or ducklings in a farmyard; the careful studies of Prof. Lloyd Morgan in this direction, as given in his valuable book, "Habit and Instinct," are well worth reading.

The same sort of defense is secured in various insects, especially in the Hemiptera, an order of true bugs, by the secretion of a cottony or scaly covering, as in the case of the bark lice and related forms so troublesome to fruit growers; and still others, as the frog hoppers, or froth flies, conceal their sap-sucking larvæ in the grass, or upon a leaf, beneath a frothy exudation, called by the country people "cuckoo spit" or "frog spittle." The pear and vine "slugs" are additional instances. These coverings not only hide and disguise the insects, but make them distasteful to many insectivorous animals.

One might carry this review very widely through the animal kingdom, but enough has been said to give a hint of the importance this sort of self-defense has among otherwise feeble folk.

AUTOMOBILE NOTES.

The recent automobile events of the Brescia Circuit, which were among the most successful ever held in Italy, have resulted in the founding of a new challenge cup by the Chevalier Florio, a well-known millionaire of that country and an ardent chauffeur. After having engaged two Panhard and two Mercedes cars in the Brescia Circuit, he now offers for next year's events a cup having the value of $20,000. It is to be competed for over the same circuit as before. This offer, as might be expected, has made quite a sensation in automobile circles; it will also give an added impulse to the question of races in Italy, where the movement has already taken a good start. Chevalier Florio has also offered the sum of $1,000 for the construction of a special automobile track in the Montechiari region. This route will be four kilometers (2.4 miles) long in a straight line and is to be "westrumited" throughout. It is intended exclusively for the kilometer and mile tests with high-speed racing cars.

The annual hill-climbing contest up Mount Ventoux, in France, which took place recently, resulted in some extraordinary performances. The course is 21.6 kilometers (13.4 miles) in length, and the total vertical rise is within 39 feet of one mile, or 5,241 feet. Rougier, on a 45-horse-power Gordon-Bennett Turcat-Méry racer, covered this distance in 21 minutes, 12 2-5 seconds, which broke the record, previously made by himself, by 3 minutes, 37 2-5 seconds. His average speed was about 40 miles an hour, which means that his machine rose vertically 4.11 feet every second, or 247 feet a minute, which is somewhat more than half the speed of the fastest passenger elevators. The average gradient of the Mount Ventoux course is eight per cent, which is considerably less than that of Mount Washington in this country, where, it will be recalled, Mr. Harry Harkness made last July on a 60-horse-power Mercedes, the remarkable time of 24 minutes 37 3-5 seconds on the 7½-mile road leading to the summit through a vertical rise of 4,600 feet. The Stanley steam car also made a record of 28 minutes, 19 3-5 seconds in the Mount Washington climb. In that at Mount Ventoux this year, two Darracq machines gained second and third places in 21:41 and 22:26 respectively, while a Hotchkiss car came in fourth in 22:49 4-5. The second Darracq car broke the previous record for light-weight cars by 2 minutes, 59 seconds, while a Darracq voiturette broke the existing record for cars of its class by 14 minutes, 10 2-5 seconds, reducing it to 29:25. A Griffon motorcycle covered the distance in 32 minutes, 20 seconds.

Probably the most scientific long-distance test of an automobile that has ever been made was that of a Packard touring car on the Grosse Point mile race track at Detroit, when the machine was driven around the oval 1,000 times without stopping the motor, in 29 hours, 53 minutes, and 37 3-5 seconds, or at an average speed of 33½ miles an hour inclusive of stops for replenishment of fuel, lighting of lamps, and changing of tires. Exclusive of these stops, the speed figures out over 35 miles an hour. The great uniformity of running is shown by the fact that out of 35 consecutive miles run at an average time of 1:46, the time of but four of these miles was as much as 1 second away from the average. This certainly is as fine a showing as any foreign car could make. That the present model Packard car performs equally well upon the road has lately been demonstrated by some San Francisco men, who drove such a machine from that city to Los Angeles in 53 hours and 40 minutes, crossing the coast range of mountains five times and fording many rivers, without the use of a single spare part, and with the renewal of but two inner tubes of their tires. No mechanic was taken along or found necessary; and, although one of the inner hub brakes gave out, thus making it necessary to use the motor as a brake in descending the steep grades, the great strain thus put upon it and the transmission did not damage either.

THE CAMERA BOOK.

BY EMILE GUARINI.

The "Photographic Book," invented by M. Leon Block, of Paris, is one of those apparatus in which an endeavor is made, through a descriptive form, to conceal the nature thereof from the sharpest eyes—a thing that is often necessary if it be desired to take a snap shot of someone. All amateur photographers, no matter how little artistic sense they may have, have been annoyed and shocked at the pose of the soldier at present-arms, and baffled by the position that is immediately assumed by a person when he sees a camera leveled at him. The new apparatus is designed to prevent such drawbacks and to permit of photographing a person secretly while off his guard. The victim may consider the process presumptuous and not very delicate, but in photography no attention is paid to trifles like that.

THE CAMERA-BOOK CLOSED.

THE CAMERA-BOOK OPEN.

PHOTOGRAPHING WITH THE CAMERA-BOOK.

The photographic book, even when it is ready for operation, preserves the aspect of an ordinary pocket dictionary. The operator opens it at the first page, and while apparently reading, has really under his eyes the ground glass of the finder, and, at the side, a water-level to show whether or not the apparatus is horizontal. The finder is provided with a prism so arranged that the operator, while apparently looking in front of him, can actually see upon the ground glass an image of the objects situated at the side. The image that is depicted upon the finder is that of the persons who are located to the left of the instrument, and it is toward them that are turned the two objectives concealed in the back of the binding. The apparatus is stereoscopic and gives 1.5 x 2-inch images upon 1.75 x 4-inch plates, which are contained in small metallic plate holders, the number of which is limited only by the capacity of the operator's pockets. The plate holder is slid into one of two grooves formed in the edge of the book, and it is by the selection of one or the other of these grooves that the focusing is done. The one farther away from the lens serves for objects situated at a distance of one or two yards, and the other for objects situated beyond such a distance. The shutter is capable of making the exposure instantaneous, and for such a purpose the apparatus is placed upon a table. The handle that serves to set the shutter, as well as the device for freeing it, is within easy reach of the hand, and both are so well concealed that the book loses nothing of its harmless aspect.

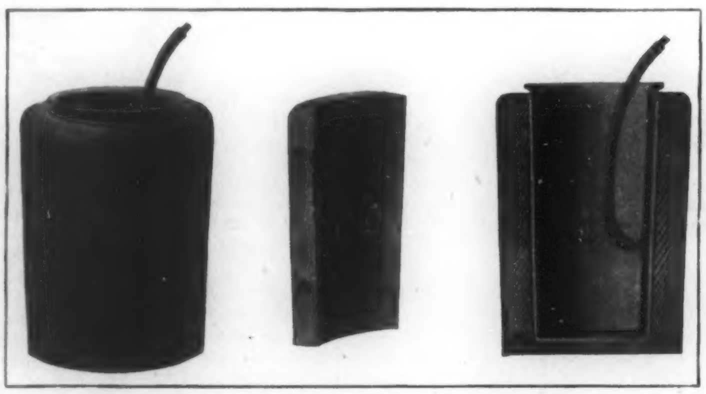
HYDRAULIC PRESS FOR EMBOSSING SILVERWARE AT THE ST. LOUIS FAIR.

BY THE ST. LOUIS CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

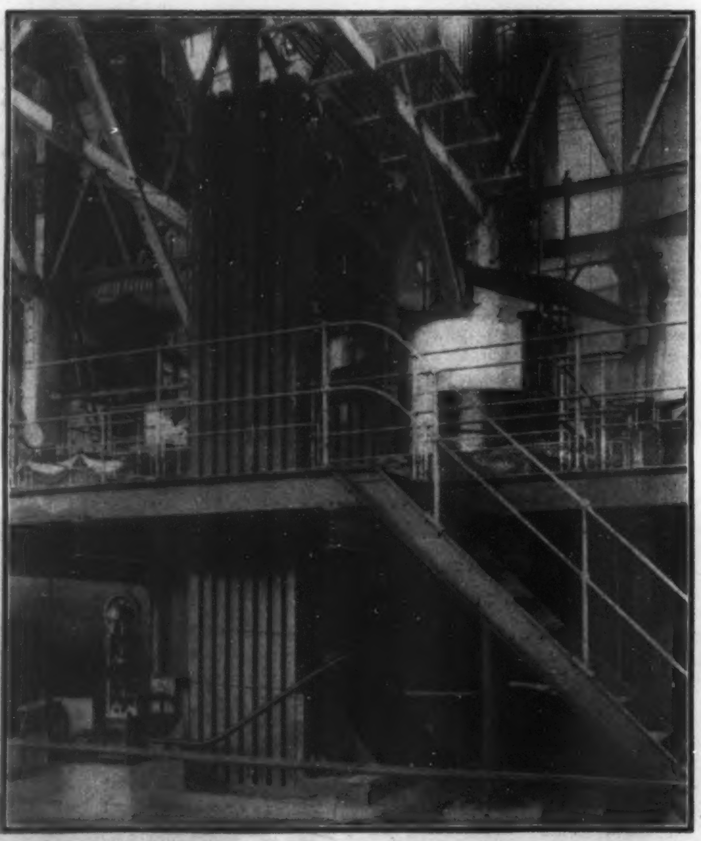
When we remember the magnificent exhibit made by the great Krupp firm at the Chicago World's Fair, it is surprising to find that there is no separate and distinctive Krupp exhibit to be found at the St. Louis Exposition. Here and there may be found specimens of their forgings and finished work embodied in various machines and appliances, but with one single exception the famous German firm is not represented.

The single exception, however, is a notable one. It consists of a massive hydraulic press, weighing in the aggregate 121 tons, which is located in the Machinery Building. The press is a fine piece of work, but its attraction is the fact that it employs a hydraulic pressure that is altogether unprecedented, namely, 85,000 pounds to the square inch. The purpose of the press is to produce by a quick and cheap method the finest forms of embossed silverware, chiefly in the way of flagons, vases, urns, etc.; and this it does at a speed, and with an accuracy of reproduction of the desired pattern, that render the product exceedingly cheap, the actual process of embossing taking only the few seconds' time during which the hydraulic pressure is acting upon the metal.

While the machine itself will be of interest, it can never be regarded with any very kindly feeling by the true lovers of art, for the product, which is known as the Orivit ware, of which a splendid collection is shown in the German section of the Varied Industries Building, is machine-made pure and simple, and is utterly devoid of those marks of handicraft which are the chief glory of hand-made silverware. Embossed silverware, as most of our readers will know, is produced by hammering out the pattern, stroke by stroke, with much care and labor, the silver metal being laid upon some soft and more or less yielding substance, that allows the stroke of the hammer to produce the desired impression.



The Die, Form, and Interior Rubber Cup Used in the 85,000-Pound Press. Machinery Building, St. Louis Exposition.



GENERAL VIEW OF THE 85,000-POUND HYDRAULIC PRESS FOR EMBOSSING SILVERWARE. MACHINERY BUILDING, ST. LOUIS EXPOSITION.

In the present case, the vase or bowl is rolled out approximately into its final form, and is then placed within a hollow steel die formed in four sections, in which the pattern has been cut by hand, the outside of the silver cup or vase lying in snug contact with the inside of the sectional hard-steel mold. Inside the silver form is inserted a rubber cup, and to the inside of the cup is attached the hose of an air pump, the end of the hose being screwed into a nozzle, that passes through the rubber cup to its outer surface. After the rubber cup is inserted, the air is exhausted from between its outer surface and the inner surface of the metal form, so as to place the two surfaces in snug contact. After several pieces have been thus prepared, they are placed in a metal basket and lowered into the water within the cylinder of the hydraulic press, which in the case of the one herewith shown, is 17 inches in diameter. The cylinder stands on a platen located within a series of eight massive steel yokes, and at the top of the yoke is carried a hydraulic plunger. The platen rises, carrying the cylinder with it, and as the plunger enters the hydraulic pressure is raised until it reaches 85,000 pounds to the square inch. Now, since the silver forms in their molds are immersed in the water, it will be seen that there is a hydraulic pressure of 85,000 pounds on the outside of the sectional steel die, and on the inside of the rubber cup, the result being that the silver metal is squeezed into the recessed embossing cut in the dies, and practically flows into the very finest interstices and hair lines of the pattern, producing a very perfect impression. At first thought, one would suppose that the rubber would be disintegrated under a pressure which is two and one-half times as great as the powder pressure in the powder chamber of the modern gun at the moment of firing, but in spite of its elastic character, rubber has extraordinary tenacity, and it seems to suffer no damage from being subjected to this enormous load.

The press is 21 feet in height, and the frame is made up of eight Siemens-Martin open-hearth steel yokes, the legs of which are 3 inches in thickness by 12 inches in width, each yoke weighing 4 tons. The pump is run by a 70-horse-power motor, which is belted to two three-plunger pumps. The press is controlled from the upper platform, shown in our engraving, and the handling of the pieces is done by means of a hydraulic crane, shown to the right of the platform. When the press is working on small pieces, it is claimed that the loveliest specimens of embossed silverware can be turned out at the rate of so many a minute. While we cannot but admire the mechanical ingenuity and daring with which this remarkable press has been designed, we must be pardoned for a feeling of regret that herein we see one more of the fine arts cheapened by the substitution of mechanical for hand labor. Such, however, is the tendency of the age, and it is certain that the end is not yet.

The torpedo-boat flotilla of the Austrian navy is to be reconstructed, and in view of the discussions which have taken place as to the speed required for destroyers, the fact that the Austrians have fixed on 28 knots is interesting. This speed is to be attained when the vessels are carrying a load of 100 tons representing fuel and ammunition. The 25½-knot boats for the British navy are required to carry 120 tons, and it is matter for serious consideration whether this justifies the decrease in speed of the vessels.

SOME NEW TYPES OF LIFEBOATS.

An interesting development of the gasoline motor for marine purposes has taken place in England, where it has been applied to a lifeboat for the Royal National Lifeboat Institution. For many years past the authorities have been following the progress of the utilization of this type of engine, with a view to its employment in lifeboats, as a mechanical means of assistance to the men, thereby relieving them somewhat of the heavy work entailed in approaching a wreck against heavy seas and head winds.

Deeming the present a ripe and suitable time for such an experiment, the Institution, acting upon the advice of their consulting naval architect, Mr. G. L. Watson, resolved to select an old lifeboat, install therein a gasoline motor, carry out a series of exacting experiments therewith in all sorts and conditions of weather, and to act upon the experience thus derived in the construction of a special vessel for the purpose. In this manner valuable constructional data would be obtained, which would be impossible in any other manner. The general scheme on which the motor should be installed in this lifeboat, together with all the necessary details, were intrusted to Capt. E. du Boulay, the marine motor engineer of the firm of Thellusson & Co., of Cowes, in the Isle of Wight.

The successful adaptation of the gasoline motor to a lifeboat involves the surmounting of several inherent difficulties, such as do not present themselves in other boats, owing to the peculiar nature of the work the lifeboat has to fulfill, and the adverse conditions under which it has to operate. In the first place, it is imperative that the motor should be adequately protected from the violence of the waves that are incessantly shipped. To attain this end necessitates the inclosure of the engine within a perfectly water-tight case. Yet there must be an adequate air supply, to obtain the complete combustion of the gases. This requisition was fulfilled by a pipe leading into the case inclosing the engine, so arranged as to prevent the influx of water when waves broke over the craft, and to dry and heat the air before it reached the engine.

Then again the motor had to be as completely automatic as possible, since when once started the engineer would not be able to devote any minute or careful attention to it, especially on a cold, dark night with a heavy sea running, owing to the more important work he would have in hand. Under these circumstances a completely reliable system of lubrication had to be incorporated, the orthodox sight feed oilers being entirely useless.

Further, all those parts which from time to time require a certain amount of manipulation had to be lengthened and extended, so that they could be handled by the engineer from without the case, and moreover the handles to same had to be of different shapes, so that they could be readily and easily distinguished in the dark. The vaporizer had to be of special design, so as to readily and instantly accommodate itself to all possible positions, and not starve the engine or fail to work when the boat is standing more or less on end, or when heavily listed over by a sea or the pressure of the sails. But what was far more important was that the lifeboat should not lose its self-righting qualities owing to the weight and position of the machinery, and also that the motor should automatically stop in the event of capsizing, since when it righted itself again it would race away uncontrolled, leaving the crew in the water, and the latter might further be imperiled by the revolving propeller. Then again the engine must not interfere with the ordinary rowing or sailing capacities of the boat, while the engine itself had to be of the simplest construction in working, since it has to be manipulated by persons who invariably are not skilled mechanics, and must always be ready to start instantly at any required moment, either in summer or winter, even after long periods of enforced idleness.

The craft selected for these exacting experiments was an old one withdrawn from the Folkestone station on the south coast. It measured 38 feet in length by 8 feet beam, was pulled by twelve oars double-banked, and was of the usual self-righting type, rigged with jib, fore-lug, and mizzen. At the shipyard some of the air cases under the deck amidships were withdrawn, and a strong mahogany case measuring 4 feet long by 3 feet wide, and as high as the gunwales, lined with sheet copper so as to be watertight, with a closely-fitting lid easily removable if necessary, was fitted in their place. In this case was placed a two-cylinder Fay & Bowen motor of 10 horse-power supplied by the Mitcham Motor Company of Cowes, together with all the necessary pumps, vaporizers, electric equipment, etc. The motor drives a three-bladed propeller through a long shaft with a disconnecting clutch between, so that for starting or stopping the engine temporarily, the screw can be disconnected from the engine by raising the clutch.

The gasoline is carried in a metal tank stored away inside the forward end box, where it is safe from any possibility of accidental damage. Sufficient oil fuel is carried in this reservoir for a ten hours' run. The motor is started by a handle in the usual way. The position and size of the motor case is such that only two oars are interfered with, but this does not necessarily mean that the services of two men are rendered nugatory, since they can double-bank some of the other oars if desired.

The vessel was completed last April, and was submitted to several preliminary tests in the varying weather of that month. It was found that the boat could be driven fairly well against a sea by the aid of the engine alone. But it was while working in conjunction with the sails that the true efficacy of the motor as an auxiliary power was realized, and the boat could be worked to windward in a manner that was hitherto impossible. It was also observed that neither the heeling effect of the sails, nor the pitching and rolling in a seaway, interfered in any way with the proper working or starting of the motor, and it ran evenly and regularly throughout, thereby showing that the vaporizer successfully accommodated itself to the varying positions of the boat.

A series of severe tests and trials were then carried out by Commander St. Vincent Nepean, R.N., the Chief Inspector of Lifeboats, together with Mr. Barnett, who represented Mr. G. L. Watson, who was unfortunately absent through illness. The trials were as follows:

1. Running on the measured mile, with full crew and all stores on board, the boat developed a speed of just over 6 knots. The mean draft in these conditions was practically the same as when the craft was an ordinary lifeboat, with her crew and gear in her, and her water ballast tanks filled.

2. With the equivalent weight of 13 men lashed on the thwarts, and with all the equipment on board, she was capsized by a crane four times, but never failed to self-right, even with sails set and sheets made fast.

3. During the capsizing, the motor, which had been previously started, was automatically stopped directly the boat reached a position just beyond that of "on her beam ends."

4. After the capsizing, the motor started again at the second turn of the starting handle, and worked well.

From the foregoing it will be realized that the gasoline motor can be satisfactorily adapted to the requirements of lifeboat work. It gives in combination with the oars and sails an assistance for reaching a wreck, especially should the casualty have occurred dead to windward.

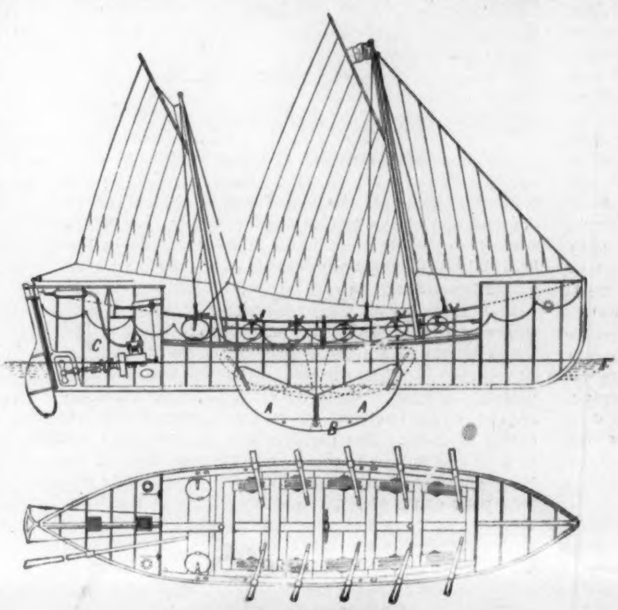
Encouraged by the success of these trials, the Institution has resolved to further test the lifeboat by placing it in regular service at Newhaven during this winter. By following the behavior of the craft under actual life-saving conditions much valuable data will be obtainable, which will be of inestimable service in the future construction of motor-propelled lifeboats.

One of the most interesting features of the Life-Saving and Hygiene Exposition which is now being held in Paris is a new lifeboat invented by M. Albert Henry, who is connected with the Government Arsenal at Rochefort. The novel points lie in the combination of a movable keel, a set of water-tight compartments, and a screw operated by a gasoline motor. The new lifeboat possesses two valuable qualities, namely, that it is steady in all seas and is also insubmersible. This has been shown in actual tests, which are referred to below. The boat is an evolution of the old lifeboat which uses an iron keel fixed to the bottom of the boat about 20 inches below the water line and weighing 650 pounds. These figures seem to be about the limits which can be used in practice with this system. The weight of the keel cannot be increased too much, as the boat must be light and easily handled. On the other hand,

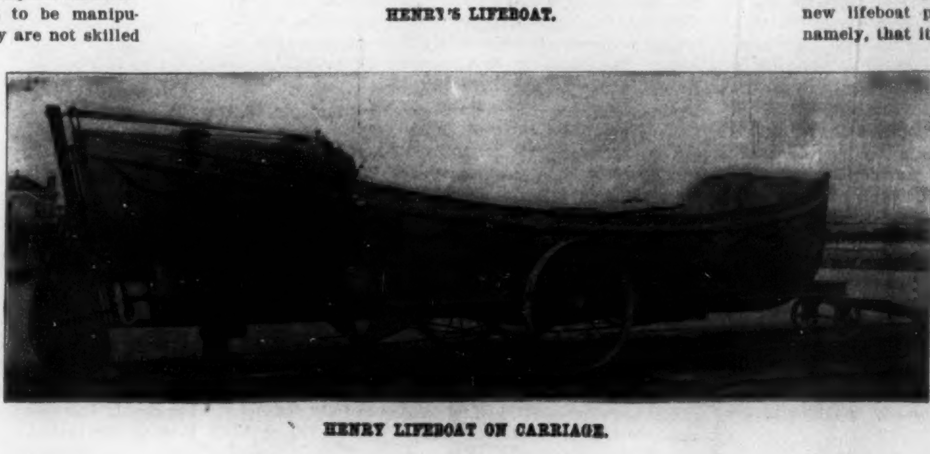
LIFEBOAT FITTED WITH 2-CYLINDER 10 H. P. GASOLINE MOTOR, INCLOSED IN A WATERTIGHT CASE TO PROTECT IT FROM FOUL WEATHER.

THE MOTOR BOAT CAPSIZED.

As the boat turns, the motor automatically stops running; but it can be easily started up when the boat rights itself.



HENRY'S LIFEBOAT.



HENRY LIFEBOAT ON CARRIAGE.

the keel cannot project too far down, as otherwise the boat will not run in shallow water.

In the new boat designed by M. Henry, stability is assured by a system composed of sheet-iron pieces which project from the bottom of the boat. To the lower part of these pieces is fixed a torpedo-shaped cast-iron weight of about 650 pounds which serves the same purpose as the weighted keel of the lifeboat mentioned above. By the present arrangement, the weight is made to descend much lower than in the former type, and it now has a leverage of over three feet, which greatly increases its efficacy in keeping the boat steady. As the sheet-iron plates have a surface of over three square yards, they offer a considerable resistance to the lateral movement of the boat. This arrangement of sheet iron support and weight has been employed for some time upon various forms of pleasure craft. But in these latter boats the device was fixed, and while it no doubt served sufficiently well in these cases, it could not be adopted for lifeboats, as the disadvantages of such a system are apparent in cases of landing the boat or putting it to sea. Some means therefore had to be found for making it movable and allowing it to be drawn up into the boat when not in use.

M. Henry has now succeeded in accomplishing this by a very simple device which presents no difficulty in operating and does not take up too much space. The weight, with its sheet-iron carrying pieces, is movable up and down, and enters a chamber in the bottom of the boat. This occurs either automatically, as when the keel strikes an obstacle or comes ashore, or on the other hand, it can be drawn up by hand from the inside of the boat by a windlass, and does not come above the flooring. The new form of keel, which is somewhat crescent-shaped, will be noticed in the diagram at the middle of the boat. It has a comparatively short length and is formed of two sheet-iron wings, *A A*. At the top the wings carry a slot (which is placed so as not to reduce the side resistance) allowing them to slide upon two specially-designed bolts. At the lower part the wings carry a cast-iron weight *B*, which is made in two longitudinal parts bolted together, thus forming a slot in the middle which receives the wings. The latter are thus pivoted to the weight by bolts. To the middle of the weight is attached a steel cable of 0.15 square inch section which passes up in the middle of the boat and works upon a hand drum. Working the drum causes the keel to rise and take any desired height. When fully drawn up, the wings take the position inside the chamber which is shown in dotted lines, while the weight lies against the bottom of the boat. This chamber is made of an appropriate form to receive the keel and lies below the flooring of the boat. By this means the stability of the boat is assured in an efficient manner, for when the keel is lowered, the boat draws nearly five feet of water instead of less than two feet as before. With the keel up the draft is about two feet.

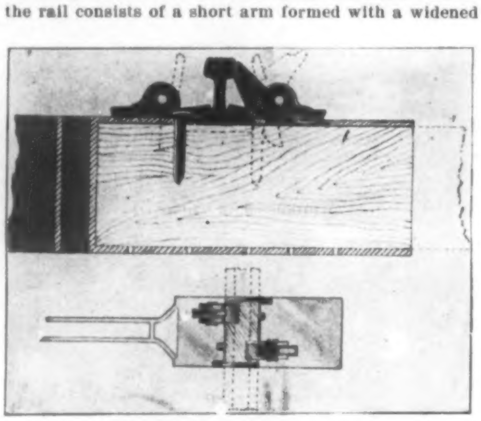
Another valuable point about the new boat is that it secures the complete evacuation of the water which is shipped. This is carried out by means of an orifice which runs along the whole length of the keel-chamber. The resistance of this chamber to the movement of the boat is stated to be ten times less than with the usual evacuation tubes. It has a surface of 45 square feet, being 18 feet long and 2.5 inches wide. This allows the instantaneous evacuation of the water. A system of valves is used to prevent the projection of water from below through the chamber. The use of the specially-formed keel comb. .d with the evacuation of the water prevents the boat from overturning, and it is also made insubmersible. To this end it is provided with a system of air-compartments which are separated by partitions. The compartments have oval-shaped doors and can be used for keeping different kinds of stores.

As regards the propulsion of the boat, it is equipped with the usual sails and oars, besides a small petrol motor. The difficulty of placing a mechanical propelling device in a lifeboat has been overcome in the present case. M. Henry uses a small gasoline motor which is intended as an auxiliary in connection with the ordinary means of propelling the boat. Its principal use is to facilitate the maneuver of entering or leaving the port, and to enable it to carry out all the necessary movements so that it can approach and aid a ship in distress with great rapidity and ease. This it does by helping out the sails and oars, which are often difficult to handle when near the ship and offer great risks both for the crew and the passengers. In the present case the motor is placed as shown in the diagram in the stern chamber, *C*. As this chamber is of small size it makes the motor somewhat difficult to place, and its weight and power must be limited to give a speed of 6 knots. This speed can be increased to 8 knots by using the sails at the same time. The form of the boat, which can carry 40 to 50 persons, is designed so as to give the greatest possible stability with the maximum load. High speed is a secondary point with this kind of craft, and is sacrificed to the general security.

The lifeboat has been recognized in France as one of the best craft of its kind. It was classed in the first place in the concourse which was held at Brest in 1903, for the best projects for lifeboats provided with auxiliary motors. M. Decout-Lacour, the constructor, shared the honors with M. Henry. The concourse was held under the patronage of the Brittany Life Saving Society, and the present lifeboat was recognized as possessing all the improvements and qualities necessary for this special form of service, and answered in all points to the requirements of the Commission. A series of actual tests upon a boat made according to the above project was made not long ago in the port of La Rochelle, in the presence of over 10,000 persons, among whom were delegates of different life-saving societies and other marine interests. The tests included putting the boat to sea by means of a special carriage, trials of its solidity by dropping it into the water from a crane at a height of 18 feet, tests of steadiness and evacuation of water (in one case a cask containing 120 cubic feet of water was emptied into the boat from a height of 15 feet); also tests of towing other boats, and maneuvers of life-saving and landing. In all the trials the boat made a brilliant showing and was highly applauded. The first Henry lifeboat is now stationed at the port of Brest, and others have since been built.

METAL CROSS TIE FOR RAILROADS.

A railroad tie has recently been invented which combines the cushioning effect of the ordinary wooden tie with the strength and durability of a metal tie. The rail rests on wooden blocks, which are securely held in metal boxes. The metal boxes form opposite ends of cross ties, being connected by pairs of metal plates, as indicated in our plan view. A recess is cut in the top plate of each box, to admit the base of the rail. A pair of ears are formed at diagonally opposite sides of this recess, to receive the pivot pins of a pair of clamping devices. The clamp on the inner side of the rail consists of a short arm formed with a widened



METAL CROSS TIE FOR RAILROADS.

end, which fits over the base flange of the rail. The opposite end of the arm is formed with a cam swell, adapted to pass through a slot in the top plate of the box, and rest on the wooden block. The outer clamping device is similarly formed, but is in addition provided with a limb, which projects diagonally upward and serves as a brace for the ball of the rail. When lay'ng the track, the rail is placed in position, and the clamping device is adjusted before the wooden block is driven into place. When the block is driven in, it engages the cam swells of the clamps, pressing them securely in place. The block is then secured in place by a pair of spikes driven therein through slots in the top plate of the box. These slots are indicated in our plan view of the tie. The heads of the spikes overlap the base flange of the rail, and serve as additional securing devices. While this tie is applicable for general track use, it is designed more especially for a safety curve and bridge tie. When the wooden blocks wear out, they can be discarded and replaced with new ones. Only a short block of wood is used instead of a full-length cross tie, thereby effecting a great saving of wood. The inventor of this cross tie is Mr. ·'en Newell, of Guadalajara, Mexico.

The Current Supplement.

The current Supplement, No. 1501, contains an unusual variety of interesting articles. The Italian first-class battleship "Regina Margherita" is fully described and illustrated, together with her engines. Of domestic interest is a brief but instructive article on non-poisonous textile and egg dyes for household use. The subject of plastic cements employed to secure joints in vessels and connections (generally for temporary purposes) has been rather neglected in chemical literature. For this reason Mr. Samuel S. Sadtler's contribution on "Lutes" should receive no little attention, containing as it does a great number of useful formulæ. Mercadier's system of attuned telegraphy is fully described and illustrated. Mercadier makes use of alternating currents which, by the application of tuning fork interrupters, are taken from direct-current sources for the transmission of telegraphic signals in his multiplex system. Mr. W. Watson describes an excellent quartz thread vertical force magnetograph. Prime Minister Henry A. Balfour's scholarly address on "The Work of a Great Ethnologist" is concluded. The St. Louis correspondent of the Scientific American describes the Chinese Pavilion and Exhibit at the Fair. Excellent pictures accompany his contribution. Mr. Walter Wood gives much curious information on Atlantic cattle carrying. A striking picture of the leg and foot of a spider is presented, striking for the reason that the picture in question was taken by means of a camera alone. One of the most valuable articles which has ever appeared in the Supplement is that by Prof. W. F. M. Goss on the modern steam locomotive. Dr. S. Tolver Preston contributes an excellent article on the mechanics of the gyroscope.

MODEL OF THE PENNSYLVANIA RAILROAD HUDSON RIVER TUNNEL STATION AT NEW YORK.

BY THE ST. LOUIS CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

Our front-page illustration, from a photograph taken at the St. Louis Fair of a large model of the Pennsylvania tunnel station that is to be built at New York, gives an excellent idea of the internal arrangements and vast proportions of this great structure. The ground on which the station is to be built measures 500 feet by 1,000 feet. The building itself measures 400 feet by 800 feet. The model is made on a scale of ⅜ of an inch to one foot, and as it is 22 feet in length, it is large enough to permit the architectural and constructional features to be made perfectly clear. The station will stand partly below and partly above the street level. It will be 45 feet from the street to the tracks, and there will be practically three floors—first the track level, with 21 parallel tracks running side by side the entire length of the station, then a second floor 20 feet above the tracks, and a third floor at street level. Our illustration shows the interior of the main rotunda, a ma·· ificent hall 85 feet in width, 300 feet in length, an· 50 feet in clear height. This will be the most magnificent hall of its kind and purpose in the world. At night time it will be lighted by the huge electric globes shown in our view, each of which will be 10 feet in diameter. There will be ladies' and gentlemen's waiting rooms on the right, and on the left of the rotunda will be a dining room and a combined waiting room for men and women. The broad concourse at the right of the rotunda will be roofed with glass; it will be 120 feet wide by 300 feet in length and ·0 feet in clear height to the roof, and its floor will be on the same level as that of the main rotunda. At each end of the station, at the level of the second floor, will be the tracks of the proposed Seventh and Eighth Avenue Rapid Transit subways, with convenient connections by broad entrances and exits from the subways to the Pennsylvania tunnel station. No one will be permitted to cross the tracks, gradual ascents and descents being made by stairways, although it is probable that by the time the station is built, moving stairways or elevators will be substituted. The superstructure of the building, above ground, will be three and four stories in height, and the noble façades will be treated in a severely classical style, consistent with the long perspectives and massive dignity of the building.

Adjacent to the model of the station, stands another fine specimen of the model maker's art, showing a section along the center line of the Pennsylvania Railroad tunnel from Hoboken to Long Island. The scale is 1-1,000 full size, and the section is carried down from the surface of the ground to a level considerably below the bottom of the tunnel. The model in plan takes in a considerable stretch of Hoboken, Manhattan, and Long Island, and the buildings and streets are reproduced to exact scale with remarkable fidelity. At intervals, seven subsidiary cross sections are introduced, showing the nature of the construction at the points where the cross sections are taken. These represent the tunnel construction at such points as Bergen Hill; at the center of the North River, where the tunnel consists of two tubes carried on cast-iron piles; at the point where the two tracks merge in a common tunnel; at another point under Manhattan and nearer the station, where the tracks diverge into a three-track tunnel; and a section showing the four-track tunnel portion between Eighth and Ninth Avenues. The two models together afford very complete information as to the leading engineering features of this, the greatest piece of tunnel and station construction ever undertaken by a railroad company.

Vesuvius's Latest Eruption.

Vesuvius is in eruption again. A piece of rock weighing about two tons shot out of the crater a week or so ago, and lava was flowing out of the crater so hot that it has melted the steel rails of the road that runs up the volcano.

Correspondence.

A Snake Poison Remedy.

To the Editor of the Scientific American:

Having read the article in the August 13 number of the Scientific American on Dr. Vital's experiments with snake poison, I thought you might be interested to learn of another remedy for snake bites. A gentleman who has spent some time with the "cowboys" of the Indian Territory told me he had seen the remedy used many times with success. This remedy is the pure powdered indigo, which, when placed on the wound, seems to draw the poison entirely out. The "cowboys" carry little bags of indigo to be ready in case of emergency, either for themselves or any of their animals—horses, dogs, or cattle.

San José, Cal. Mrs. G. W. Hilton.

The Sun's Rays and the Black Race.

To the Editor of the Scientific American:

In the "Journal of Experimental Medicine," Vol. IV., page 279, and Vol. I., page 361, for 1896; and in the "American Journal of Physiology," Vol. II., page 291, for 1899; also a little volume by Rev. Dr. S. Stanhope Smith, the late president of Princeton College, Princeton, N. J., on the "causes of the variety of complexion in human species" are exhaustive contributions of scientific literature, which have a bearing upon the relation of the pigment of the dark-skinned races to the sun.

Drs. Abel and Dorrs, of the chemical laboratory, Johns Hopkins University, Baltimore, and Prof. Chittenden, of the physiological laboratory at Yale, both conclude that the pigment of the dark-skinned races protects them from the thermic rays of the sun.

In Prof. Keane's "Man Past and Present," in Ripley's "Races of Europe," in Dr. Giuseppi Sergi's "History of the Mediterranean Races," and in Lopinard's "Anthropology," are chapters of interesting light on "the effect of the sun upon the dark-skinned races." And while there are no black races indigenous outside of the tropics, the leading American, English, French, and Italian ethnologists boldly teach that the white races of the world are simply modified negroes, and that the Anglo-Saxon and other white races are of an African origin, having crossed over into Europe during the Neolithic age, and that their habits, character of food, environments, attitude of their homes, climate, occupation, their greater distance from the rays of the tropical sun, are some of the etiological factors which have bleached our skins and made us white.

Rev. Jas. M. Boddy,

Troy, N. Y. Liberty Street Presbyterian Church.

The Death of Prof. Neils R. Finsen.

Prof. Neils R. Finsen, discoverer of the method of curing lupus or tuberculosis of the skin and other skin diseases with light rays, and director of the Finsen Ray Institute in Copenhagen, is dead. For many years he suffered from a complication of diseases. So intense was his devotion to his work that he neglected himself day and night, to the despair of his friends, hardly sparing time enough from his duties for sleeping and eating. His death is attributed to overwork, aggravating the diseases from which he had suffered all his adult life. Prof. Finsen was forty-three years old, and a native of one of the Faroe Islands. The institute of which he had been the head since 1896 is supported through private benefactions and a Danish government endowment. For all this help, Prof. Finsen died poor.

Prof. Finsen's great discovery, that sunlight and electric light rays contain properties that can be used to cure skin diseases, was the outgrowth of his experiments begun as a student in Copenhagen University. In a small attic of the old surgical academy building the investigation started. A fellow student, Sophus Bang, shared Finsen's enthusiasm for a complete reform in therapeutics. When ill health came to both, Bang sought refuge in Switzerland, and since has become one of the foremost anatomists of Europe. Finsen remained at home to carry on his investigations in the foggy and cold climate of Copenhagen.

In 1890 Prof. Finsen was graduated from the Copenhagen University, receiving his doctor's degree. Three years later he published in a medical journal an article on "The Influence of Light on the Skin," which aroused general attention because of his assertion that cases of smallpox could be cured by putting red curtains at the windows of the sickroom. This was the beginning of the final triumph. Smallpox became epidemic in 1894 in Copenhagen, and the new method was put to the test. The red-room treatment became popular with both the medical profession and the public, for by it not only was the disease cured, but the red rays prevented suppuration, and left the patient unmarked by the dreaded scars.

The red-light treatment was but one application of Prof. Finsen's theory that light rays were healing, and at the best it was but a negative result; it cured only when the disease had run its course. To develop the positive element of the light-ray cure, Prof. Finsen began experimenting with artificial light rays. Soon he found it possible to concentrate rays of the ordinary electric light in such a way as to cure a lupus patient, who for eight years had tried every known method. The cure attracted great attention, and both moral and financial support came to the young investigator and discoverer.

In 1896 the municipal hospital of Copenhagen gave room on its grounds for several small buildings, in which Prof. Finsen's experiments continued on an increasing scale. Then the Danish government came to the support of the institution, and it was enlarged and removed to Rosenvaenget, a pleasant suburb of Copenhagen.

In December, 1903, Prof. Finsen received the Nobel medical prize from the Norwegian parliament. This high testimonial to his great discovery is no less significant than the fact that although only nine years have elapsed since the first use of the Finsen rays, institutions for the use of the rays are now established in every civilized country.

Garnet for Abrasive Purposes.

The use of garnet as an abrasive has found a flattering reception among manufacturers; and while it meets the competition of quartz, corundum, crushed steel, and carborundum, these materials have not limited or decreased its popularity. According to the report of Mr. Pratt in the Mineral Resources of the United States for 1902, the total value of all natural abrasives produced in the United States for that year was $1,326,755, and of this amount $132,820 was represented by garnet, as against $104,605 for corundum and emery.

Local shipping conditions influence the success of quarries of abrasive substances intimately. The Montana corundum deposits were practically shut out from the general market because of prejudicial freight rates. When these were removed, or modified, they began in July, 1903, to produce raw material at the rate of from 800 to 1,000 tons per year.

Mr. Pratt says that in 1902 the production of corundum in the United States was almost entirely of the emery variety. It was confined to Chester, Mass., and Peekskill, N. Y., the latter locality greatly increasing its output. The Canadian corundum is very largely imported into the United States, and this importation quite steadily increases. The total amount of commercial corundum produced in Canada in 1902 was 1,611,200 pounds, valued at $88,616, or nearly $110 per ton. It, for the most part, leaves Canada, and the United States is her largest customer.

Garnet as an abrasive has a good market. New localities of this material of fine quality and in accessible situations cannot fail to attract notice and reward development. An apparently rich deposit of garnet has been recently brought into business prominence, which is located on Little Pine Creek, Little Pine Creek Township, Madison County, North Carolina.

The garnets occur in a chloritic schist well developed and in large aggregates. They are the iron alumina variety—almandine—and not infrequently present superb gem surfaces, which furnish very superior cuttings.

The prospecting of this property began in January, 1904, and after the work of a month over twenty tons of good merchantable garnet was cleaned up. Work was resumed in March, and continued for two months. In this period over 160 tons were mined, and 140 tons shipped. The garnet is pronounced to be an excellent abrasive. The property promises important results, and will naturally attract some attention. The garnets resemble the famous Salida, Colorado, specimens, and furnish attractive mineral groups.

The company now engaged in the exploitation of this property is the North Carolina Garnet Company, incorporated under the laws of New York State.

M. Charley's $20,000 Prize.

The offer which has been made by M. Charley, the Paris representative of the Mercedes Company, of the sum of $20,000 for the first motor boat to cross the ocean has brought out considerable discussion in Paris, and most of it is favorable to the enterprise. This may be seen from the fact that there are already no less than seven entries among whom are Henry Fournier and H. Farman. As there has been some misunderstanding about the matter, M. Charley stated in a recent interview that the present idea is the natural outcome of the development which the racing boats have now reached in Europe. At the Lucerne races the different small craft made a brilliant performance. The boats covered a distance of 70 miles with a mean speed of 25 miles an hour and arrived at the finish with only a few seconds difference between them. The present racing boats are nearly ready to make an ocean trip, and if they are not quite up to the point they will be so before long. As to the opinion that a supply of 2,000 gallons of petrol will be needed to cross the ocean, he thinks a good motor should not consume more than half this amount. As to the practical value of such a performance, one point is that the transatlantic liners could carry a number of such small craft on board which would be greatly superior to the ordinary lifeboat and would run at 25 miles an hour toward the coast or to seek aid. It is understood that the Atlantic trip can be made starting either from New York or from Havre. Owing to the difference of opinion as to the original idea of the project, it may be well to state exactly what the promoters meant in proposing the $20,000 prize. The question came up at the time of the Lucerne races during a conversation between M. Charley and a number of other sportsmen. The question of high speed was discussed, and some thought that the motor boat would soon develop like the automobile and would reach a speed of 50 miles an hour before long. Others thought such a speed was too high, and after some discussion M. Charley proposed to bring the matter to a head by opening a contest for high-speed boats. It was understood that the Atlantic trip was to be made by a high-speed automobile boat which would be a further development of the present class of racers and could approach the speed of the transatlantic liners. It was not a question of heavy slow-speed craft which would take a long time to cross and would carry a great quantity of supplies.

The rules which will be drawn up will follow this order of ideas, and their object will be to develop the high-speed racing boat. The question of supplies of gasoline will be one of the most important points. There is no doubt that relays of gasoline will be needed along the way, and this can only be carried out at a considerable expense, which will limit the number of entries. Besides the industrial question the event is to be largely one of sport and will bring out the skill and energy of the best pilots. It is to be stated that M. Charley does not stop at the $20,000 prize, but now offers to found an International Atlantic Cup which will be held by the winner as usual. To show how favorably the idea is being received here, it need only be mentioned that up to the 16th of September there were already seven engagements received. One of these is from Fournier, the winner of the Lucerne cup with the Hotchkiss boat. It is his intention to undertake the Atlantic trip along the lines proposed by M. Charley. He expects to start next May or June with an automobile boat which will vary from 60 to 100 feet in length. The motor will be of nearly 100 horse-power, and a noteworthy point is that he expects to use heavy petroleum as fuel, with a specially designed carbureter. He has also provided for securing supplies of petroleum by the aid of five yachts along the route, as he does not expect to carry more than 200 or 250 gallons on board. Besides this, two Mercedes boats will be built for the occasion, along the lines which proved so successful in the "Mercedes IV." M. Quernel, the eminent naval engineer who laid out the plans of the latter craft, is thoroughly convinced that the idea is practicable. According to him, with a boat of 80 horse-power, a displacement of 20 tons, and a speed of 15 miles an hour, the trip would take 10 or 12 days. But allowing it to take on supplies *en route*, the boat could be considerably smaller and travel much faster. Another entry is that of M. Noé Boyer, of Paris, with the "Cananto Boyer." It is to have a 100-horse-power motor, built by Thevenin Bros., and Henri Loste will pilot it. Following these four engagements is a fifth from H. Farman and Wimille, a sixth from Thubron, who has entered the "Trèfle-à-Quatre" (Geo. Richard make), the winner in the Monte Carlo races. The seventh entry is that of M. Louis Ravel.

In England the question has awakened great interest. Mr. S. F. Edge, the constructor and pilot of the Napier boats, states that he approves the idea thoroughly, and even before this had thought of crossing the Atlantic. In fact, he had taken an order from an American sportsman for a 300-horse-power boat, which was to be delivered next March. It was stipulated in the contract that the boat was to come to New York by sea, so that M. Edge now proposes to enter the contest if the rules will permit, and thus accomplish a double purpose.

Prof. Van't Hoff, through the medium of the Zeitschrift für physikalische Chemie, offers a prize of $300 for the best and most complete synopsis of the literature of catalytic phenomena. The last day for the receipt of papers in this competition is June 30, 1905; the papers must be addressed to the Editors of the Zeitschrift, 2 Linnéstrasse, Leipzig. The competition is to be decided by Profs. Van't Hoff, Arrhenius, and Ostwald.

In Madagascar, a motor car service, which was commenced on June 1, 1903, for the conveyance of mails and passengers between the East Coast and Antananarivo, has been worked with regularity and has given very satisfactory results. The road is 152 miles in length; its width is 16 feet 6 inches, of which 10 feet is macadamized. The maximum gradient is 1 in 12.5, and its minimum radius 11 yards.

ARMOR AND WEAPONS OF THE DE DINO COLLECTION.—II.

BY ISABEL R. WALLACH.

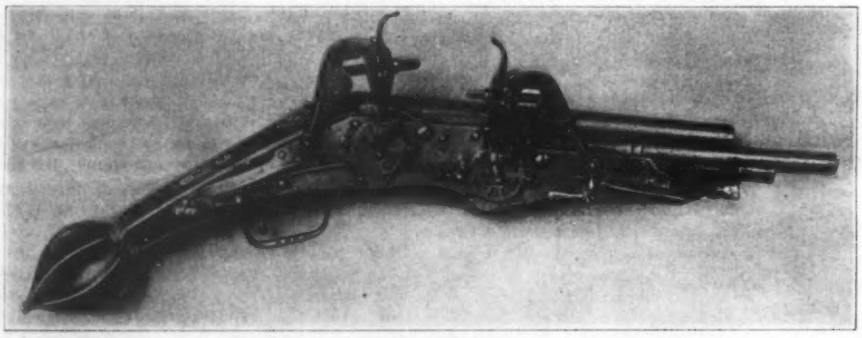
In a previous article published in these columns, the more prominent pieces of armor in the admirable De Dino collection, lately acquired by the Metropolitan Museum of Art, New York city, were described and illustrated. It is the purpose of the present brief review to tell something of the more important weapons, which add much to the historical value of that collection, and of some additional suits of armor.

One of the most splendid specimens of these medieval weapons is the Papal sword of Sixtus V., emblazoned with the arms of the haughty Albani. Other blades are here of rare Toledo and Milanese workmanship, showing the wonderful skill attained by the swordsmiths of the period. The wealth of decoration lavished upon

(Continued on page 250.)

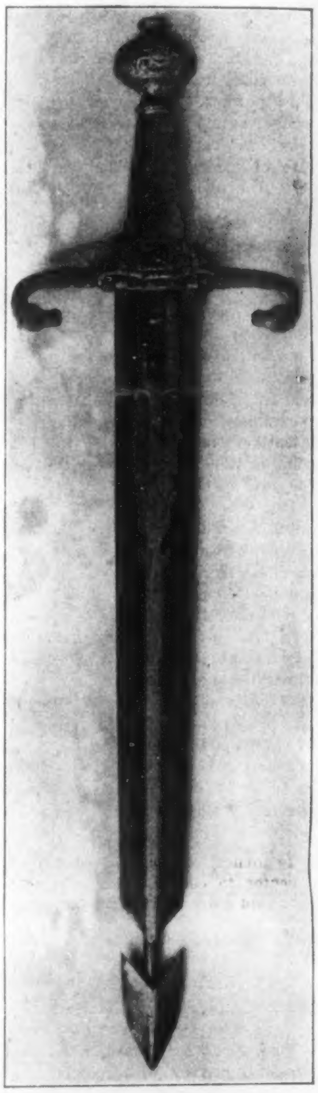
The Helmet of Henri II. Seen from Both Sides. Its Rich Ornamentation Pictures the Heroic Deeds of Hercules.

Calendar Hunting Knife with Pistol, Which Marks the Transition Stage to Firearms.



An Early Double-barreled Firearm in the De Dino Collection.

The Sword of Aben Achmet.



A Curious Dagger and Pistol Combined.

The Flutes of This Maximilian Suit Imitate the Ruffs and Slashes of the Court Dress of the Epoch (1530).

Armor Made by Colman of Augsburg About 1550. The Tournament Plates for Reinforcing the Armor of Shoulder and Face are Added.

An Example of the Most Specialized Form of Jousting Armor. Its Weight is Nearly 90 Pounds. The Helm is Bolted to the Breastplate.

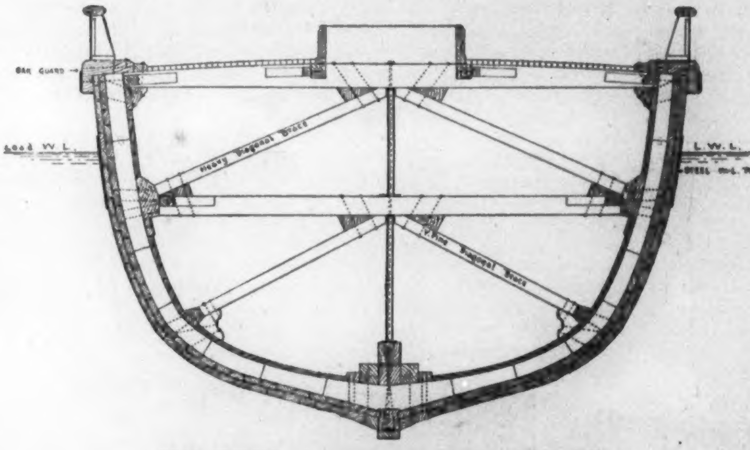
ARMOR AND WEAPONS OF THE DE DINO COLLECTION.

PEARY'S NEW SHIP FOR WORK IN ARCTIC SEAS.

All that experience and all that the cunning of the naval architect can suggest will be combined in Commander Peary's new ship, that he is having built in Maine for his final effort to reach the North Pole. Fashioned of unusual strength and girded and armored as was never Arctic craft before, it is Commander Peary's belief that he may be able to force his way through the interfering ice until he has carried his vessel within reasonably easy striking distance of the topmost point of the globe. His intention is to force the vessel as far north along the frigid shores of Grant Land as possible, and there, from this utmost land base, to make his dash by sledge across the great central polar pack. Apart from giving him a shore base a hundred miles nearer the pole than would Franz Josef Land, the coast-line will give him an easier line of retreat on the return trip. To carry his party and two years' supplies so far northward into the great ice barrier of that region, the new vessel will be strong enough to force its way successfully through the opposing floes, and, by reason of her great endurance and the power in her engines, be able to cleave a way where others have failed.

The new ship is not large, but she is of ample size for the work cut out for her, and everything has been done to make her handy and serviceable. Her principal dimensions are: length on load water-line, between perpendiculars, 161 feet; length over all, 181 feet; beam, maximum, at load water-line, 32 feet; beam, maximum, over guard strake, 34 feet, 2 inches; mean draft, 16 feet; full-load displacement, about 1,500 tons.

The structural get-up of the craft will be very massive, and the stem, sternpost, keel, keelsons, and frames will all be of very carefully selected white oak, fastened and secured with exceptional thoroughness. The frames, molded at heel 16 inches and at head 10 inches, will be spaced only 24 inches apart, from center to center. Immediately over the frames will be laid diagonal straps of steel, making a lattice lacing from bow to stern and from stern to bow, leaving rectangular openings between, six feet square. Outside, over the straps, will be laid a double course of 5-inch planking, the inner course of yellow pine or spruce and the outer course of well-seasoned white oak. Between the two courses will be spread a sheathing of tarred hemp or tarred canvas. The courses will be secured to the frames very thoroughly, and the outer course, after it has been most carefully calked, will be overlaid with extra heavy sheet copper. Inside, the frames will be covered with 3-inch yellow-pine ceiling, and the utmost caution will be exercised during construction to insure thorough water-tightness and to have the vessel warm and weather-proof. The beams will be of yellow pine, and likewise made of exceptional stoutness. The main deck beams will be spaced four feet apart, from center to center, or on every other frame. The lower beams will be spaced directly under the deck beams. As shown on the cross-section, all of these beams will be well anchored, and most extensively tied by numerous through-bolts riveted up inside. To provide still greater athwartship strength, each



CROSS-SECTION OF COMMANDER PEARY'S NEW SHIP.

beam will be supported by heavy diagonal braces of yellow pine, likewise well anchored and through-bolted. To give greater vertical stiffness, each beam will be supported by tie-rod stanchions of steel and wrought-iron piping, so arranged that they may be set up from time to time during construction, thus to provide against any sag developed in building and to insure a most rigid support. As can be seen, the craft is built to withstand very heavy pressures acting normally to the sides, bilges, and bottom; and the shape of her cross-section is such as to tend to raise the vessel out of water as the ice pack presses upon her below water. A heavy white-oak guard, 8 inches by 20 inches, will be worked abreast of the plank sheer from stem to stern, and so securely fastened to the frames, plank sheer, and waterway, that it will be able to support the weight of the entire ship. On the face and under side, this guard strake will be protected by a heavy angle-bar of steel. The purpose of this guard strake is two-fold: First, to add greatly to the longitudinal stiffness of the ship and, second, to serve to lift the craft out of water, either by jacks placed upon the ice or by the upward pressure of the ice pack itself catching under the counter of the guard. The first operation is to relieve the ship should she be frozen in—her own weight, in settling again, combined with the wedge-like form of bow and stern, being enough to break a wide crevasse in the ice, thus opening clear a way for progress. The second operation will be automatic, and will relieve the ship from the grinding, crushing effect of gathering ice packs in motion. To take the worst of the rub of passing ice, the bow, the stern, and the water-line will be armored. The bow protection will consist of 1-inch steel plating worked from the keel up to three feet above the water-line, and extending aft for ten feet. The stern protection will be of like strength, reaching from the keel up above the water-line, and extending forward for fourteen feet. The water-line armoring, extending completely between the bow and the stern protection, will be of ⅝-inch plating, 5 feet wide, one foot only being above board at load draft. The main deck will be planked with 3 inch by 4 inch yellow pine most carefully calked, and the hatch coamings, of stout white oak, will be nearly as high as the top of the bulwarks, thereby adding to the effective freeboard of the ship.

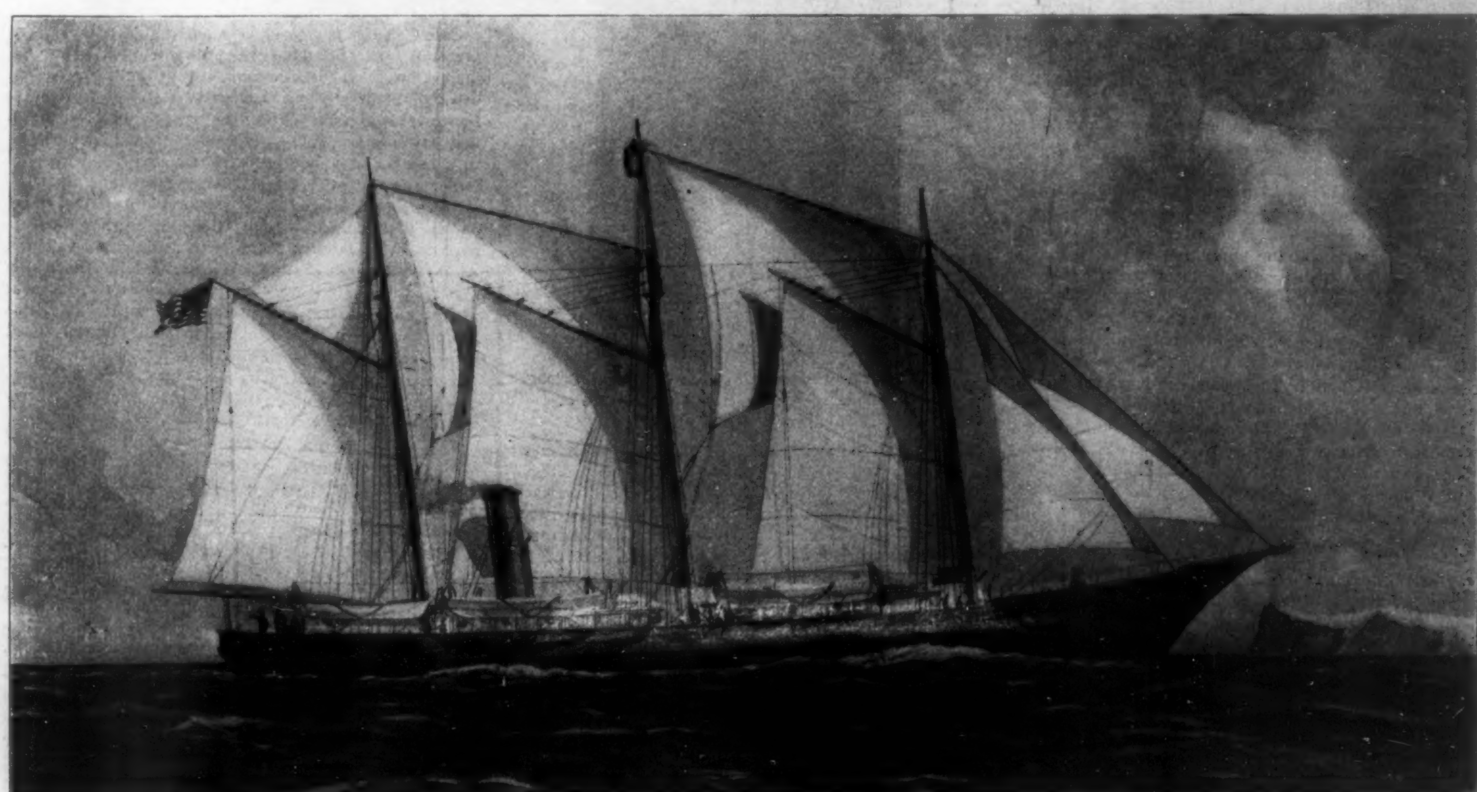
The vessel will carry two deck houses, and the forward one, which will be portable, will be large enough to accommodate Commander Peary, the scientific staff, and the officers of the ship. When the ship has reached as far north as it is possible to force her, this deck house will be carried ashore to serve as winter quarters, and, upon the departure of the sledge expedition, as a store-house for the more important supplies. The crew will be comfortably housed either in the fore castle or aft between decks, where accommodations will be provided for them. It is highly likely that the Eskimos and their dogs, which Commander Peary will take on at Whale Sound, will be housed under the forecastle; but this is a detail not yet settled.

The living spaces will be comfortably but very simply finished, and the ship will be heated by steam and lighted both by electricity and by oil lamps.

The motive power will consist of a single, inverted, compound engine, driving a single 10-foot screw, and steam will be supplied by two water-tube boilers. Under forced draft, the engine will be able to develop 1,400 indicated horse-power, and under natural draft, 1,200 indicated horse-power. The bunker capacity is 700 tons of coal; and at starting, the vessel will carry a deck load, in bags, of 150 tons more. With this supply, at a 10-knot cruising speed, she should be able to do between four and five thousand knots.

There will be a steam capstan and steam steering gear.

The vessel's rig is rather unusual, but is sufficient in



THE NEW SHIP WHICH COMMANDER PEARY IS BUILDING FOR HIS NEXT DASH FOR THE POLE.

spread of canvas to make her manageable under sail alone. The individual sails are designed to make it easy for a small crew to handle them. The standing rigging will be of galvanized steel wire rope. The foremast and the mizzenmast will be single sticks. A crow's nest will be carried on the maintopmast.

The hull of the new ship is building at the shipyard of McKay & Dix, Verona, Me., and complete will cost about $75,000. The engines and auxiliary, being constructed by the Portland Company, Portland, Me., will cost quite $45,000. The utmost dispatch, consistent with thoroughness, is to be devoted to turning the boat out by the early spring.

Some time in June or early in July, Commander Peary hopes to start northward, the ship's complement to consist of about forty persons, exclusive of Eskimos, and by the end of the Arctic summer he expects to have forced the ship to the far north shore of Grant Land. With the first return of light, he will start on his sledge journey over the great central polar ice pack, using the flower of the Eskimos for the rank and file of his party.

Commander Peary's indomitable will and physical force are wonderfully, though passively, graven in every line of the sturdy craft that has been designed to bear him farther north than ship yet has broken her way; and to Mr. William E. Winant, naval architect, much credit is due for the skillful manner in which he has planned to meet every contingency of that severe Arctic climate and service.

ARMOR AND WEAPONS OF THE DE DINO COLLECTION.—II.

(Continued from page 248.)

blade, hilt, and scabbard partake of the goldsmith's art rather than that of the craftsman in steel. Great two-handed swords may here be found of dimension and temper that bear out the tales told of men cleft in twain at a single stroke.

But of all the knightly swords, the most valuable in the present collection, and the one that appeals strongest to our sympathies, is the magnificent blade of Aben Achmet. Sheath and steel are of rare Hispano-Moorish workmanship, resplendent with enamel and gold and silver filigree. It figured in a tragedy accompanying the fall of the house of Abencerrages and the ruin of Granada. Pathetically near the historic sword lies the elaborately-wrought Koran case of its liege, Boabdil the Unlucky, last of the long line of Moorish kings to reign in Europe. The pole arms of this period are characterized by brutal savagery curiously wedded to exquisite art. The heavy spiked mace, the enormous battle-axes and hammers, the torturing triple-edged pikes, amply justified the iron sheathing in which the warrior incased himself.

A curious and most interesting weapon is an elaborately gilded dagger, made in Germany in the latter half of the sixteenth century, and carrying a pistol concealed within its blade. The removable tip of the dagger forms the key which, inserted in the knob of the hilt, wound the wheel-lock. The latter is visible through the oblong opening at the upper end of the blade. A flint is attached to the under side of the band of *repoussé* that bridges the hilt. This bridge is movable, and, as it descends, it releases the spring that revolves the wheel, brings the flint in contact with the wheel, and sends a shower of sparks into the pistol beneath, discharging its bullet. The weapon is ingeniously contrived, and was no doubt highly prized by its owner.

Unlike the dagger, the Calendar hunting-knife, dated 1540, carries its firearm openly. Its German maker must have been proud of his clever handiwork, for boldly has he made it declare: "ICHENN .·. HAD .·. DISSE .·. KOLLENDER .·. GEMACHT." (Ichenn made this calendar.)

There is also exhibited a sword-cane once the property of Philip II. of Spain. It has a Toledo blade of wonderful temper. Still another remarkable piece has a pistol dated 1612, which displays a complete double battery. The mechanism of the ingenious wheel-lock is clearly seen.

The harquebuses and pistols show how far the love of ornamentation was carried. Inlay of pearl and ivory and overlay of gold and silver, *repoussé* and incised work cover the stocks. The metal work of the weapon, as well as its wheel-lock, key, and powder flask, show treatment akin to that of the goldsmith's art.

Among the smaller weapons are specimens interesting alike for their beauty and ornament, and for the ingenious devices that insure the attainment of their fatal purpose. The early firearms attracted much attention, specially those in which the mechanism of the old-time wheel-lock is visible. Prototypes crude and curious are here displayed of our modern rifle and double-barreled gun.

The finest specimen in the De Dino collection, so far as weapons are concerned, and, indeed, the finest specimen of its kind in the world, is a sword fashioned during the reign of Francis I. The hilt is wound with braided gold wire of extreme fineness and ends in the bust of a woman, the modeling and carving of which are perfect. Similar busts terminate the cross-bar, and a coiled serpent guards the end.

The exhibit of the helmets in the collection is likewise most comprehensive. Those who have read the previous article will recall the many types there illustrated. It may be fitting in this place, however, to call attention to the royal burginet of Henri II. of France. Its sides tell in rich relief of the victory of Hercules. The casque forms part of the gilded armor he wore when as Dauphin he visited his royal father, Emperor Charles, confined a prisoner of war in Madrid.

In the previous article some splendid specimens of armor in the collection were illustrated and described. Moving from case to case of the collection, one cannot help noting how fashion changed in these steel garments, even as it does in ordinary dress to-day. The earliest suits show shoes ending in a cruel spike, with other spikes projecting from the arm pieces. A swift thrust from a foot or elbow thus armed was likely to leave an indelible mark. Later the square-toed shoe, supple and flexible, by reason of its many plates, came into favor. It is to be seen in the royal suit of Philip II. of Spain, of bloody memory in England and the Netherlands. Over the heart is the cross of Calatrava and d'Alcantara. It is hard to reconcile the meaning of this symbol with the ruthless persecution its wearer instituted in the Protestant lands he sought to conquer. A large portion of this richly-decorated suit, as stated by Baron de Cosson, formed a part of the collection of the Madrid *Armeria Real*. From this armory nine

A Large Portion of This Highly-Decorated Suit Belonged to Philip II. of Spain. It Bears the Cross of Calatrava and d'Alcantara.

ARMOR AND WEAPONS OF THE DE DINO COLLECTION.

pieces of this suit were abstracted in 1839. The backplate, the breastplate (with its dependent pieces), footplate, and the defense of one forearm are added from a similar suit. The latter pieces formed part of the harness, of which parts are still preserved in the Madrid Armeria, which appears to have belonged to a member of the family of d'Onata. The suit was made in Germany about 1554.

Still another suit belonging to Philip II. is also displayed. Philip II. was painted in this second armor by Titian and Rubens. A century later, Velasquez used it in his portrait of Count Benavente, now in the Prado Gallery in Madrid. This armor was fashioned by a German artist about 1550. The numerous pieces of richly-decorated armor in the particular case containing the suit and in a neighboring case formed a complete panoply of which the parts could be changed according to the needs of its wearer. In the specimen illustrated, the tournament plates that reinforce the armor of the shoulder and face are added. The suit was probably made by Colman of Augsburg. The sword hilt in the left hand of the armor is of Spanish make, and dates from the middle of the sixteenth century. It is the work of Sohagun el Viejo of Toledo, the swordsmith of Philip II.

A very rare specimen is a florid and flamboyant suit with its grotesque visor mask. The puffing and slashing of the court dress of the day (1530) is imitated in the metal, and the anatomical lines are followed with admirable fidelity, even to the instep and gauntlet. Every vulnerable point is guarded; yet nowhere is the movement of the joint or muscle hampered in the slightest degree. The lightness of the plates indicates that the armor was designed for occasions of ceremony. The human face visor is rare. Baron de Cosson finds evidence regarding this armor (one of the most valuable of the collection) as having been a gift of the Emperor Maximilien to one of the dignitaries of his court. The left hand of the armor holds a Spanish sword made during the sixteenth century.

A remarkable harness is the jousting armor made by a German craftsman about 1500. This is an example of the most specialized form of jousting armor. Its weight is nearly 90 pounds. The helmet, weighing 22 pounds, was bolted to the breastplate, and is of sufficient size to enable the wearer to turn his head. The armpits were protected by large rondelles, and a shield fastened at a single point served as a mark for a lance thrust. The lance of this period was sometimes over 16 feet long (about 4 inches in diameter near the hand), and weighed nearly 40 pounds. It could not, therefore, be held very well, but had to be balanced between a separate "fork," attached to the breastplate, and a long arm riveted to the backplate. Such was the weight of the armor, and the rapidity of the charge, that a lance which struck squarely would be splintered. A barrier separated the jousters, and rendered armor for the legs unnecessary. The headpiece of a horse mounted under the suit illustrated indicates that the horses were sometimes blindfolded to prevent their shying.

Hydroplanes—New Forms of Gliding Boats.

This name, formed on the analogy of aeroplane, is suggested for vessels which, instead of floating in water, glide over its surface as sleighs glide over ice.

Two such gliding boats have recently been invented in France, one by the well-known constructor Ader, the other by Count Lambert. Ader's is a flat-bottomed boat provided with wings and tail like a bird's, which, when expanded, graze the surface of the water. Air at the pressure of one-twentieth of an atmosphere is forced under the wings and tail, raising them and the boat with them until the bottom just touches the surface. The resistance being thus diminished, the boat is driven forward rapidly by a submerged propeller.

Though the boat worked fairly well, it is too complicated and unwieldy for practical use, and has been presented by its inventor to the Conservatoire des Arts et Métiers, where it is to be preserved as the embodiment of an ingenious idea.

Count Lambert's boat is much simpler and more practical. It somewhat resembles a raft, being six meters long and three meters wide. Under the bottom are five planes, whose inclinations to the horizontal increase progressively from the first, at the bow, to the last, at the stern. When at rest the boat is submerged to a depth corresponding to its weight; but when the motor and propeller are started, the bow and then the stern are forced upward by the pressure of the water on the inclined planes until the boat is raised to the surface, over which it skims with astonishing velocity. At the first trials, in May of this year, it made 32 kilometers an hour with a 14-horse-power motor. A boat of ordinary construction would have needed 40 horse-power for such a speed, and the motor actually used would not have driven it faster than 15 kilometers an hour. In a later trial, after some alterations had been made in the machinery, the Lambert boat made a record of 34.5 kilometers (21.42 miles) an hour.

The screw works between two rudders which, of course, are very deep. The boat cannot move backward except very slowly, but this defect could be remedied by making the planes movable, and reversing their inclinations with the reversal of the screw.

It is obviously unsuited for rough water, but its simple construction and great speed with small consumption of power recommend it highly for use in harbors and rivers.

Here its sphere of usefulness is restricted, like that of any other screw-propelled boat, by shoal water and by vegetation; for though Lambert's boat has no appreciable draft when moving at full speed, its screw is deeply submerged when at rest. Screw-propelled boats also have the unpleasant property of fouling shallow waters and driving away fish.

All these disadvantages, in the case of the Lambert boat, can be obviated by replacing the water propeller by an air propeller.

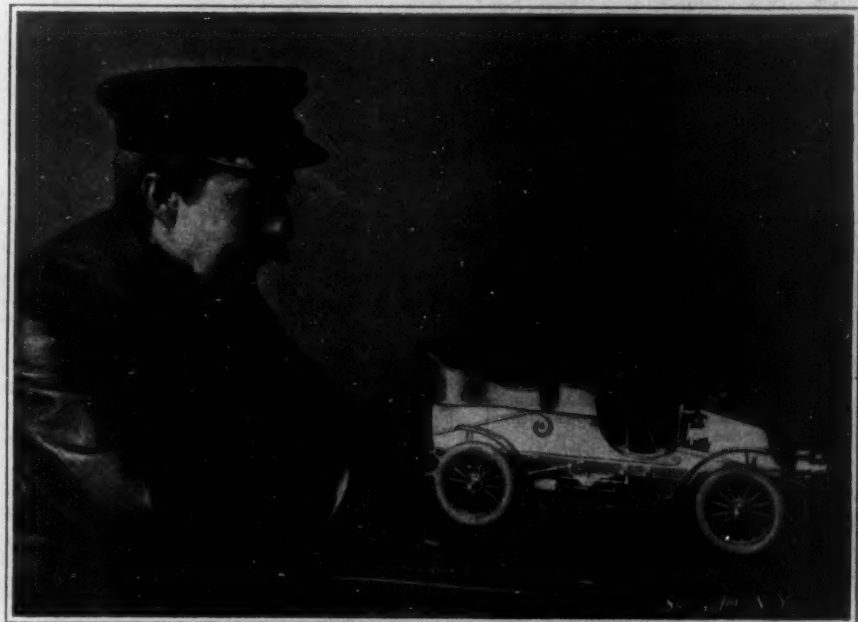
The air propeller is not a new invention. It was used by Count Zeppelin in a boat designed to assist in the trials of his first airship, and was described and illustrated in these columns. An aluminium windmill about two meters in diameter, driven by a 12-horse-power motor, propelled this boat at the rate of 12 or 14 kilometers an hour, a performance nearly equal to that of boats with submerged propellers of the same horse-power.

A Lambert boat, or "hydroplane," similiarly equipped, should skim with ease over very shallow water and over or through vegetation.

PERFECT WORKING MODEL OF A WINTON TOURING CAR.

In the SCIENTIFIC AMERICAN of September 19, 1903, were illustrated some very interesting models, made by Dr. Frank W. Brandow, of Pittsfield, Mass. By far the best model which Dr. Brandow made, one which was not included among those published in the issue referred to, was a beautiful miniature Winton touring car. It was exhibited at Tiffany's for a time.

Dr. Brandow makes these models simply for pastime, and never sells them. The model of the Winton touring car is perfectly made to scale, one-eighth of an inch to the foot, from blue prints and a set of drawings furnished by the Winton Motor Carriage Company. The little car is constructed of silver-plated and oxidized bronze, silver, copper, and aluminium. The silver lamp is a perfect model; the side lights are reproductions of the Dietz lamp. The upholstery is made of kid. All the working parts have been carefully fashioned, such as the steering gear, brake lever, and the like. The artillery wheels are also exact copies, the tires having been made by a Chicago firm. The entire model weighs about fifteen pounds, and is two feet long.



PERFECT WORKING MODEL OF A WINTON TOURING CAR.

THE LARGEST NARWHAL TUSK.

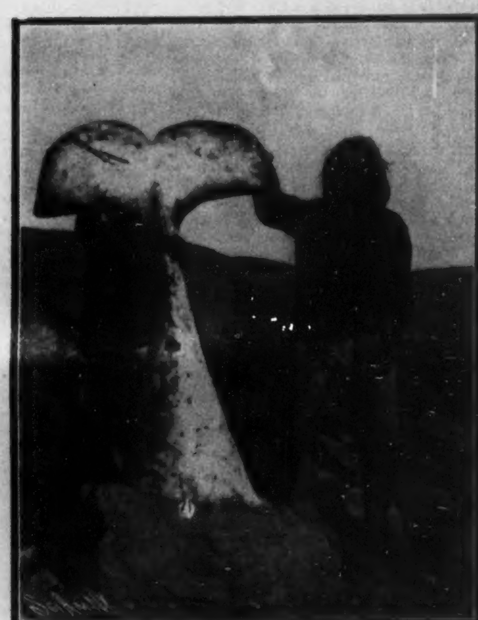
BY WALTER L. BEASLEY.

Probably one of the least known and strangest of all the sea animals is the narwhal (*Monodon monoceros*) conjectured by some to be the original of the fabled unicorn. The great peculiarity of this graceful cetacean lies in its long tusk, a polished ivory shaft, straight as an arrow and sharp as a lance, which protrudes from its head to a great distance. This formidable and glittering appendage gives to the animal a striking and spectacular appearance, excelling most of the other land and water inhabitants of the frozen world. One of the most showy and highly-prized trophies which Lieut. Robert E. Peary brought back from his last journey to Greenland was the ivory tusk of a narwhal, recently presented to the American Museum of Natural History. This is the record-breaking specimen of the world, so far reported, measuring eight feet in length and eight inches in circumference at its thickest part. A realization of its height is gained when it is placed alongside a man, the extreme point of the tusk overtopping his head two feet. An extremely rare specimen of interest to naturalists is a head having two horns, one twisted in an unusual manner. The big tusk is spirally grooved. Its use is thought to have been for defense, breaking the weak ice to obtain breathing holes, and also as a weapon to secure prey. These strong, piercing tusks could easily penetrate the bottom of a good-sized vessel, if she was fairly struck when the animal was moving at full speed. The range of the narwhal is from 76 degrees to 83 degrees north latitude in Greenland, which takes in the extreme north of the western hemisphere. Whale Sound, Inglefield Gulf, Cape Sabine, and Payer Harbor are favorite haunts of this animal. Mr. Waldemar Jochelson, of the Jesup expedition, reports having seen a narwhal tusk at Kulic Bay, on the Arctic coast of northeast Siberia, which was longer than a native's height by a foot. The Asiatic Eskimos and maritime Chukchee, who dwell along this desolate and frozen region, from the mouth of the Kolyma River to East Cape, a stretch of 3,000 miles, go out into the open sea in pursuit of this animal. Clever ivory carvings in miniature of animals and natural objects are executed by the natives on the tusks, also fashioned into various implements. They are of systematic habits in Greenland, appearing at certain times in schools, making excursions into the various bays and fjords in search of food. A band of a hundred or more form a picturesque sight when plowing through the water in military-like procession, the long, glittering horns all rising in unison as they come up to the surface to blow. Their advent is hailed with delight by the Eskimos, as they are said to be the forerunners of the early approach of the right whale, which, like the narwhal, uses the same kind of food, consisting of mollusks, fish, etc. A skate over two feet long and one foot in breadth has been found inside a narwhal. It is considered somewhat remarkable that it managed to swallow a fish whose breadth is nearly three times as great as the width of its own mouth. It is most probable that the fish was pierced with the narwhal's horn and killed before it passed down the throat of the toothless animal. The body of the narwhal is dotted with black and white spots, the eyes are small, and the blowhole is situated on the top of the head.

The animal furnishes a highly esteemed food for the Greenlanders, and is actively pursued during the hunting season. A big carcass is considered a rich prize by the fortunate hunter. The nutritious skin forms the most delicious sort of chewing gum for both men and women, and is regarded as a choice luxury. The body is covered to a depth of three or four inches with a layer of fine blubber, weighing half a ton and yielding a large amount of the best grade of oil. In laying in stores for his dash over the Greenland ice-cap, Lieut. Peary has stated that the animal provided some of his most nourishing supplies. The blubber was cut into small chunks, and packed in tin cans. The skin was divided into strips, and given as food to the dogs. It appears hardly credible to the sportsman of civilization, yet it is all the more a tribute to the bravery and skill of the Eskimo hunter, that this leviathan of the Arctic, with a powerful body and tusks having a combined length of from 20 to 25 feet, could be killed by his captor seated in a frail skin kayak, with only a crude bone harpoon as weapon, yet such is the case. Modern firearms have not yet been adopted in this remote region. White explorers shoot the narwhal, but in many instances fail to secure their game, owing to the sinking of the body before it can be reached. According to Lieut. Peary, the surest method is the one adopted by the natives, who cautiously approach the narwhals in their kayaks, while they are feeding or sporting in the water. During these playful exhibitions, as they rise to the surface, they sometimes cross their horns as in fencing. On these occasions, the keen-eyed and experienced hunter watches for the moment when the animal reaches the surface to blow, and then hurls his harpoon with all his strength into its body. After this weapon has been thrown, it penetrates the animal's flesh in a longitudinal manner. Soon, however, owing to the weight and pressure of the shaft, and also to the increased movement of the wounded narwhal, the head of the shaft is forced into a transverse position in the flesh, and the head of the harpoon at the same time becomes detached from the shaft. The injured narwhal is then held secure by the line until exhausted. The weapon has an inflated skin buoy or float attached to it, which is used to keep the body from sinking while it is being towed home or to the shore, to be *cachéd* in a rock or high ledge.

A DOUBLE-HORNED NARWHAL, WITH TWISTED TUSK—A RARE SPECIMEN.

AN 8-FOOT NARWHAL TUSK, THE LARGEST ON RECORD.



THE TAIL OF THE LARGEST NARWHAL EVER CAPTURED.

The experience gained with the use of pressed peat as locomotive fuel in Bavaria, Austria, Sweden, and Russia is stated to be very satisfactory.

RECENTLY PATENTED INVENTIONS.

Apparatus for Special Purposes.

OVEN FOR COKING PEAT WITH RECOVERY OF BY-PRODUCTS.—E. Bremer, Mariupol, Russia. The object of the invention is to provide an oven more especially designed for coking peat by dry distillation in a very economical manner by utilizing the gases produced as fuel for the heating of the reducing-retorts. Its construction consists of a suitable number of vertical retorts, of refractory material and arranged side by side, of any suitable material, the retorts being combined into groups and allowing free access from the bottom.

SNOW-MELTING APPARATUS.—H. C. Davis, Philadelphia, Pa. The invention provides novel details of construction for a snow-melting apparatus that afford convenient, practical means for the speedy conversion of snow from the city streets into water. By the provision of such apparatus at suitable points in the streets it will be possible to remove the snow on a large area before it obstructs travel.

TURPENTINE-STILL.—J. F. Bailey, Valdosta, Ga. Broadly stated the invention comprehends a still, special steam-heating means, a steam generator, a cold water tank, having therein any suitable worm or column condenser, the worm being in open communication with the upper part of the still, and a steam-operated pump having suitable connection with the supply of cold water, the condenser tank, and the steam generator. The pump is worked by steam which has in its live state served for heating the still. Improved results are attained through inductive action produced by the pump in the steam passageways through the still, whereby with a minimum use of steam an improved production of turpentine, tar, and resin is had.

Of Interest to Farmers.

MOWING-MACHINE.—C. H. Hewer, High Street, Cricklade, Wilts, England. Mr. Hewer's invention relates to a track-cleaner for mowing-machines designed to clear the cut grass from the standing crop during the first cut around the field or across the standing crop, and thereby dispense with the manual labor usually required to remove this cut swath before the field or piece can be completed, a requirement which often entails great loss of time and crop.

Of General Interest.

MIRROR-FRAME.—L. B. Prahar, New York, N. Y. The purpose of the invention is to provide an exceedingly simple construction of mirror frame, wherein the mirror can be securely held between two sections, one section entering the other, and the flange at the outer section be rolled or clamped upon the corresponding flange on the inner or front section in such manner as to make a smooth, overlapping connection without the use of solder.

DEVICE FOR USE IN SHARPENING PENCILS.—A. D. Fagerlius, Chicago, Ill. The object of this invention is to provide an improved device for sharpening pencils with a knife, which is simple in construction and arranged to permit convenient carrying in a pocket and to allow an accurate and quick sharpening of the pencil. The device comprises a sleeve, formed with guide fingers against which the knife is drawn when sharpening the pencil, and which therefore prevent the knife from cutting too deeply into the wood and from breaking the lead of the pencil.

NON-REFILLABLE BOTTLE.—P. McGrath, Hibbing, Minn. Mr. McGrath's invention is an improvement in that class of attachments for bottles adapted to render them non-refillable. The attachment in the present instance consists of a pair of ball valves, adapted to assume different positions, according to the position in which the bottle is held, so as to allow or prevent escape of the liquid.

ROPE-FASTENER.—H. Gartelman and P. E. Schnitzer, New York, N. Y. The invention provides a simple and inexpensive device which is especially designed to securely fasten a rope without chafing or cutting the same, and at the same time permit the rope to be pulled out of place easily and quickly, the rope being so manipulated that it will not double or kink during the operations of fastening or releasing the same.

Machines and Mechanical Devices.

TIME-LOCK.—E. A. Marsh, Chicago, Ill. Mechanism is provided by this inventor to prevent overwinding of the clockwork, and the bolt has the form of a hook which protrudes from the lock and is moved laterally. The several dial wheels may be read off together, a single pointer being common to them all. The invention relates to time-locks, such as are used for safes, vaults, and compartments wherein valuables are stored.

BALLOTING-MACHINE.—W. M. Dougherty, St. Joseph, Mo. In the present patent the invention relates to certain improved interlocking devices by which a voter is prevented from operating more than one of the counters at the same time. This application is a division of Mr. Dougherty's application for patent on balloting-machines previously filed.

Pertaining to Musical Instruments.

NOTE-SHEET.—W. R. Verstraelen and C. Alter, New York, N. Y. The object of this invention is to provide a sheet arranged to control the sounding devices of the musical instrument, to govern the forward travel of the sheet on its spool, and to control the connection of the main wind-chest with the action wind-chest.

PICKING DEVICE FOR ZITHERS.—W. R. Verstraelen and C. Alter, New York, N. Y. In this patent the object of the invention is the provision of a new and improved picking device for self-playing zithers arranged to insure a proper automatic picking of the strings according to the notation of a note-sheet.

PICKING DEVICE.—W. R. Verstraelen and C. Alter, New York, N. Y. In this case the object of the improvement is to provide a picking device arranged to insure picking of the proper strings as called for by the notation of the note-sheet and to insure full and harmonious sounding of the strings and prevent injury to the same by moving the picks easily and softly in and out of engagement with the strings approximately the same as when the strings are picked by hand.

SELF-PLAYING ZITHER.—W. R. Verstraelen and C. Alter, New York, N. Y. The invention relates to stringed instruments having a coin-controlled motor and automatic picking devices for picking the strings. The object is to provide a zither arranged to permit the use of a number of selected rolls of note-sheets on a single carrier, whereby any one of the note-sheets may be brought into operative position and unwound over a tracker-board to cause picking of the strings, according to the notation of this operative note-sheet, and to automatically rewind the operative note-sheet after the tune is played to allow resetting of the roll-carrier for another tune.

COIN-CONTROLLED APPARATUS.—W. R. Verstraelen and C. Alter, New York, N. Y. In the present invention the object is to provide an apparatus more especially adapted for use on self-playing musical instruments and arranged to utilize the introduced coin as a circuit-closer for starting the motor employed for running the instrument on which the apparatus is applied and to release the coin, and thereby break the circuit after the instrument has finished playing and the music sheet has been rerolled on its spool.

HARP-HOLDER.—C. F. Suter, Black Diamond, Wash. Mr. Suter's invention has reference to holders for mouth-harps and other instruments; and the objects are to provide a holder for instruments to be held in the mouth which shall be easily secured in position, which shall be adjustable in all directions, simple in construction, and cheap to manufacture.

Prime Movers and Their Accessories.

TURBINE.—L. E. Truesdel, Kershaw, S. C. This invention relates to a radial flow turbine, and comprises features by which the efficiency and commercial utility of the apparatus is materially increased. Steam entering through the steam-inlet nozzle imparts a driving influence to the wheel both in striking the radially disposed buckets and an annular row of buckets, in connection with a group of vanes, and an efficient utilization of the energy is effected. The web being essentially in frusto-conical form deflects the exhaust-steam outward after leaving the annular row buckets and causes the steam to lie at one side of the wheel, so as not to interfere with the turbine operation, this steam passing in constant stream from the exhaust-opening.

LOCOMOTIVE-BOILER.—J. Muhr, Dunkirk, N. Y. The object of this invention is to provide useful improvements in locomotive-boilers whereby an even draft is produced through all the flues and a ready escape is had of the smoke and gases from the flues to the smoke-stack without carrying cinders through the stack and at the same time a free exhaust at the steam from the engine is had without danger of back pressure.

Pertaining to Vehicles.

VEHICLE-TONGUE.—P. Furst, Anderson, Ind. The present invention refers to vehicle-tongues, and more especially to that type consisting in the main of a metallic tube of suitable dimensions. The object is to provide a simple, serviceable, and inexpensive tongue of the type specified which is well adapted to withstand strains to which it is subjected when in use and which may be readily adapted to vehicles of different types by simply changing the dimensions of the tongue.

JOINT-BAND.—J. C. Raymond, New York, N. Y. In this patent the invention relates to tires such as shown and described in the Letters Patent of the United States formerly granted to Mr. Raymond. The object of the invention is to provide a new and improved jointband for covering the joints of adjacent tire sections to prevent leakage and to securely hold the tire in place on the rim of the wheel.

DEVICE FOR PROTECTING PNEUMATIC TIRES.—E. Lapisse, 9 Rue de la Barriere, Elbeuf, Seine-Inférieure, France. An important feature of the invention consists in using as wire gauze a sort of wide chain made up of rings engaged one in another in the same manner as in a coat of mail. This chain is not incorporated with the rubber, but is free between the outer covering and the canvas that carries it. The chain has much greater flexibility than other wire gauze either woven or plaited.

Railways and Their Accessories.

LUBRICATING-PACKING HOLDER FOR CAR-AXLE BOXES.—J. S. Patten, Baltimore, Md. By this invention Mr. Patten seeks to provide a lubricating device in which the packing carrier will hold the packing and prevent it from shifting in the direction of the circumference of journal, and in which the carrier will take the pressure of the actuating springs so that the latter will not tend to condense or compress the packing against the journal.

Note.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of the paper.

Business and Personal Wants.

READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. **In every case it is necessary to give the number of the inquiry.**

MUNN & CO.

Inquiry No. 6044.—For machinery for peeling, cracking, cleaning and bleaching walnuts.

Inquiry No. 6045.—For outfits and supplies for confectioners, bakers, etc.

Inquiry No. 6046.—For manufacturers of broom-making machinery.

Inquiry No. 6047.—For manufacturers of wood and metal lathes, saws, drills, work benches, etc., for manual training school.

Inquiry No. 6048.—For builders of steam engines for automobiles, or makers of steam automobiles.

Inquiry No. 6049.—For manufacturers of machinery for excelsior plants.

Inquiry No. 6050.—For makers of compressed paper, to be used as a substitute for leather.

Inquiry No. 6051.—For dealers in new and second-hand gasoline launches, 30 to 35 feet long.

Inquiry No. 6052.—For the makers of an apparatus called "Long Tom" which are fixed on the wall, and a coin is fired by a small cannon.

Artificial Silk.—Wanted to purchase a practical process for use in foreign country. Address Artificial Silk, Box 773, New York.

Inquiry No. 6053.—For manufacturers of keas, without heads, to be used in the manufacture of farm machinery.

Inquiry No. 6054.—For manufacturers of soldering iron for aluminium.

Important Patent Rights for Sale. An improved ice and slush removing shoe for third rail electric roads. Address Patent Rights, Box 773, New York.

Inquiry No. 6055.—For a freezing apparatus for making ice in small and large quantities.

Inquiry No. 6056.—For manufacturers of screw machines, monitor lathes and drill presses.

Inquiry No. 6057.—For manufacturers of horse shoe and small magnets.

Inquiry No. 6058.—For manufacturers of the Brooks water tube boiler.

Inquiry No. 6059.—For dealers in Jena optical glass.

Two patents for sale. Supply tanks for water service, No. 769,550. Valve, a cut-off, for supply tanks, No. 737,941. Can furnish some valves, cut-off, in working order. P. J. Leithauser, Clarendon, Texas.

Inquiry No. 6060.—For makers of cook stoves and heaters using crude oil.

Inquiry No. 6061.—For makers of small gasoline engines and motors.

Wanted—Revolutionary Documents, Autograph Letters, Journals, Prints, Washington Portraits, Early American Illustrated Magazines, Early Patents signed by Presidents of the United States. Valentine's Manuals of the early 40's. Correspondence solicited. Address C.A. M., Box 773, New York.

Inquiry No. 6062.—For makers of small hot air engines.

Superintendent.—In trim and woodwork factory of the highest grade, to work on salary, commission or both as desired. New plant in New York city. Men with more than fifteen years' experience need not apply. Address D. E. F., P. O. Box 165, New York.

Notes and Queries.

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.
References to former articles or answers should give date of paper and page or number of question.
Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.
Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.
Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.
Scientific American Supplements referred to may be had at the office. Price 10 cents each.
Books referred to promptly supplied on receipt of price.
Minerals sent for examination should be distinctly marked or labeled.

(9464) P. D. E. writes: Will you please give me at your earliest convenience, either by letter or through your Notes and Queries column, the answers to the following questions? 1. How is muzzle energy calculated? For example, how is it that the 10-inch, 40-caliber, B. L. gun firing a 500-pound projectile, with a muzzle velocity of 2,800 foot-seconds, develops 27,204 foot-tons muzzle energy? A. The muzzle energy of a gun is computed by multiplying the weight of the shot in pounds by the square of the muzzle velocity in feet per second, and dividing the product by twice gravity (64.32) multiplied by pounds in a ton (2,240); thus $\frac{500 \times 2{,}800^2}{64.32 \times 2{,}240} = 27{,}207$ foot-tons. 2. How is the striking energy of a projectile calculated? A. The striking of a shot is its velocity energy assumed, from the muzzle energy, less air friction, divided by the distance that the force of the shot is arrested in feet or decimals of a foot. See Scientific American Supplement No. 862 on impact or the force of a blow. 3. Nickel steel weighs 40 pounds per square foot per inch of thickness. Does this hold good for Krupp armor? For example, does one square foot of 5-inch armor weigh 200 pounds, of 6-inch 240 pounds, and of 7-inch 280 pounds? A. The weight of steel plate is correct as stated. 4. The 13,000-ton battleship "Idaho" is designed for a speed of 17 knots with 10,000 horse-power. On page 31 of the 1903 Report of the Chief of the Bureau of Ordnance, it is stated that to increase her speed to 18 knots would necessitate an increase of 6,000 horse-power. Please explain how this increase of horse-power was estimated. A. An approximate formula for speed of vessels is, cube of velocity in knots per hour multiplied by the cube root of the square of the displacement in tons, and product divided by a coefficient for mold of the vessel. Have no data of the Ordnance Bureau. 5. I recently wrote to the Bureau of Ordnance requesting information relative to the weights of certain gun mounts, and the number of rounds allowed to the guns on shipboard. I received an answer stating that such data was confidential, and not issued for publication. Now on page 232 of the Scientific American for October 12, 1901, it is stated that the mount of the 6-inch 50-caliber R. F. gun weighs 5.43 tons, and the shield 2.7 tons, making the total weight for the mount 8.13 tons; and in an article on the armored cruisers of the "California" type in the Scientific American for December 1, 1900 (p. 344) it is stated that 500 rounds are allotted to the four 8-inch guns, 2,800 rounds to the fourteen 6-inch, 4,500 rounds for the eighteen 3-inch, etc. Are these figures authentic, or are they merely the result of guesswork? I notice that in the tables of guns given in Brassey's Naval Annual the weights of the mounts are seldom, or never, given. It seems to me, however, that this data is no less important than the weight of the gun itself. A. We cannot account for information that occasionally leaks out in regard to government work and methods.

NEW BOOKS, ETC.

The New Thought Simplified. How To Gain Harmony and Health. By Henry Wood. Boston: Lee & Shepard, 1904. 12mo.; pp. 195. Price, 80 cents.

Those interested in the New Thought movement, so called, are already familiar with Mr. Wood's writings. He has published a number of books, and has contributed largely to magazine literature. He is one of the more reasonable and conservative exponents of the idealistic or psychic hypothesis as opposed to the materialistic conception of being. Even to those of the opposite persuasion, there are parts of this exposition that will prove refreshing reading, and may furnish a new point of view. After all, it is the change in viewpoint which makes life a progression, and animates existence with the spirit of promise and of hope.

Conti e Calcoli Fatti. By Ing. Italo Ghersi. Milan: Ulrico Hopeli, 1904. 16mo.; pp. 191.

This small volume contains many useful tables of equivalents that will be found of value by the physicist, chemist, and engineer.

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Cutters, machine for forming curry knife edges on rotary, E. Schroeder 771,211
Dam, metal, J. L. Holmes 771,071
Dental mouth prop and mirror, cheek distender, etc., W. Hare 770,854
Dental use, combined mouth prop, tongue protector, etc., for, W. Hare 770,853
Diaper, H. B. Campbell 771,001
Dish, S. Frost 771,138
Dish washer and churn, D. B. Kenney 771,158
Displaying device, P. J. Hyzek 770,756
Door check, E. J. Wells 770,837
Door opener, G. Rischmuller, reissue 12,270
Doubletree, F. L. Wolverton 771,198
Dough mixer, W. H. Butler 771,041
Dough mixing and kneading apparatus, C. F. Hudson, et al 770,859
*Draft equalizer, C. C. Holzworth 770,806
Dress shield, O. W. Hull 770,752

Drier, feeder, and discharge, combined, F. A. Hetherington 770,896
Drying apparatus, tubular, M. Salzmann .. 770,832
Drilling machine, F. F. Hopler 771,205
Drilling machine spudding attachment, W. L. Barton 771,036
Driving mechanism, C. Waters 770,879
Driving mechanism, F. P. Pflegher 770,961
Dust extractor, A. B. Lipp 770,762
Educational concentrator, J. F. Barker 770,841
Egg beater, Paley & Bussey 771,069
Electric material, incandescent, A. Voelker. 770,991
Electric motor, E. S. Pillsbury 770,923 770,924
Electricity, apparatus for registering the supply of, C. Kapp 771,207
Embroidering machine, Bourquin & Loeb ... 771,000
Engines, firing locomotive, W. H. Strouse .. 770,786
Engines, ignition plug for explosive, W. Roche 770,927
Envelop and letter sheet for same, G. Archibald 771,115
Exercising machine, E. W. White 770,994
Explosive engine, H. Sohnlein 770,872
Fare register rod operating handle, A. H. Hall 770,901
Faucet, H. A. Schroeder 770,825
Faucet attachment, M. A. Sheldon 770,932
Fence, J. D. Paldi 771,172
Fence loom weft magazine, wire, V. Hosie. 771,151
Fence post, G. Calkins 771,042
Fertilizer distributor, J. C. Sparks 771,104
Fertilizer distributor, J. G. Daniel 771,129
Fifth wheel, D. McCausland 770,771
Fire escape, J. Iron 770,808
Fire extinguisher for textile machinery, R. McArthur 770,817
Fire extinguisher sprinkler head, automatic, J. Hunt 770,753 770,755
Fire extinguisher valve, automatic, J. Hunt. 770,754
Fireproof shutter, S. L. Sexton, Jr 770,827
Fish plate, P. H. Bieman 771,119
Flange, F. C. Billings 770,889
Flange wrench, C. F. Stone 770,941
Floating naval battery, A. P. Stokes 771,185
Fluid motor, C. F. Fogg 771,004
Folder cutter, J. Dick 771,047
Folding box, G. Maunsell-Smyth 770,918
Foot tub, J. A. Caldwell 771,124
Fraying machine, goods, J. M. Deen 771,130
Fruit pitting machine feeder, J. S. Briggs .. 770,957
Fuel, manufacture of artificial, P. Grayson. 770,851
Furnace, G. S. Kent 771,159
Furnace, R. H. McCoy 771,166
Furnace cooling device, blast, L. Keyling .. 770,910
Furnaces or converters, extracting moisture from air for blast, J. Gayley 771,008
Gage or lubricator glasses, protecting shield for, B. C. Mead 771,084
Game, C. J. Mallings 770,815
Game table, P. J. Sausen 771,210
Garment hanger, S. N. Cragin 770,991
Gas and air mixing apparatus, C. C. Dodge. 770,740
Gas burner, automatic regulating, G. W. Lord 770,913
Gas burner, safety, J. Spiller 770,830
Gas engine, J. W. Swan 771,028
Gas engine, R. C. Richard 771,095
Gate, W. P. & W. P. Elliott, Jr 770,895
Gearing, change speed, A. B. Landis 771,077
Gearing, variable speed transmission, T. B. Bennell 770,820
Glass, apparatus for forming threads on, F. Wackenhuth 771,106
Glass clamp, plate, W. G. Soule 771,215
Glass furnace, H. Hilde 770,964
Glass making apparatus, sheet, J. P. Taylor 770,882
Glassware with liquid gold, decorating, H. Northwood 770,867
Grain drill feed roller, H. D. Frerking ... 771,137
Grain dump, portable, E. R. Shettle 771,181
Grinding machine work rest, A. B. Landis. 771,079
Ground detector, three phase, P. MacGahan. 770,868
Guitar zither, accompaniment, M. Kolander. 770,984
Gun carriages, elevating and traversing gear for field, F. G. Hughes 770,965
Gun, machine, F. Kober 771,019
Harrow or cultivator, H. U. Wakefield 770,992
Harrow tooth fastening, J. Porteous 770,888
Harvester and shocker, corn, S. A. Bates ... 770,887
Hat holder, H. B. Tubman 770,835
Heat catcher, G. Thomson 770,787
Hitching device, J. G. Michaeli 770,816
Hoist, S. T. Wallace 771,108
Hoisting apparatus guide sheave, Hollenbeck & Palmer 770,857
Horn or other material, machine for treating strips of, J. F. Martin 771,082
Horse detacher, A. S. Chivers 771,045
Horseshoe, J. M. Myers 770,917 770,918
Hose coupling, S. M. Rhoads 771,094
Hot air furnace, Randall & Harris 771,026
House construction, space economizing, W. C. James 771,152
Husking roll, B. R. Benjamin 770,888
Incandescent mantle supporting device, A. B. Selden 770,826
Incubator, F. W. Iden 770,967
Incubator egg turner, W. R. Campbell 771,043
Index marker, card, G. F. Williamson 770,788
Inkstand, automatic, H. M. Sturgis 770,856
Insulator, J. F. Gill 770,862
Insulator, third rail, R. V. Dunbar 770,866
Jar, Kunkel & Robinson 770,971
Jar closure, W. E. Brown 771,121
Jewel mounting, A. A. Boismaure 770,954
Jewelry, M. L. Weiss 770,990
Journal box, W. H. Emerick 771,048
Kinetoscope, A. E. Smith 770,937
Knitting machine, D. F. Sullivan 770,942
Lamp, G. Washington 770,838
Lamp, J. F. W. Jost 771,018
Latch, C. F. Scheel 771,178
Latch, gate, F. Jentz 770,968
Lead, manufacture of white, J. Oettli 771,024
Lens boxes, J. Menchen 770,765
Lifts or hoisting mechanism, controlling device for electrical, H. Stahl 770,873
Linotype machine, multiple magazine, P. C. Lawless .... 771,100 to 771,103
Liquid separator liner, centrifugal, N. W. Gales 770,748
Locomotive turn table, W. S. Mullin 770,916
Log car standard, M. D. Liverman 770,974
Loom and weft replenishing mechanism therefor, E. E. Shelters 770,828
Loom harness mechanism, V. A. Ledoux ... 770,760
Loom shuttle, weaving, A. Abegg 771,112
Lubricator, J. H. A. Fortin 771,062
Lumber transfer device, automatic, D. C. Prescott 771,089
Manhole ventilator, D. L. Davis 770,969
Mattress, bed, H. Kintz 771,076
Mattress stuffing machine, C. W. Johansen. 771,073
Measure, C. A. Shumate 770,988
Measuring water for irrigation or similar purposes, apparatus for, Grant & Michell 771,061
Mechanical movement, A. Wood 770,780
Mercerizing apparatus, yarn, I. E. Palmer . 770,920
Metal roughing and finishing mills, spring balance for, W. H. Bailey 770,960
Microphone, E. B. Fahnestock 771,136
Milk, condensing, S. R. Kennedy 770,909
Mine track system, J. Whitehead 770,882
Mineral substances by means of the selective action of oil, separation of, C. Kendall. 771,075
Miter box, J. A. Traut 770,834
Mixer, F. A. Hetherington 770,855
Motor, Pillsbury & Bretch 770,922
Mouthpiece hygienic appliance, H. L. Cutter 771,128
Mower, I. A. Barberg 770,738
Mower bunching attachment, E. A. Johnston 770,880
Mowing and harvesting machine cutter mechanism, J. W. Crates 770,892
Mowing machine buncher, J. Gregg 771,098
Muffler, W. J. Hewitt 771,070
Mules and spinning frames, driving cylinder for, H. E. Getchell 770,900
Musical instrument, automatic, E. de Kleist. 770,982
Necktie, endless, J. P. Leggett 771,163
Necktie fastening, J. Bernstein 771,038
Nozzle, syringe, R. F. Coleman 770,730
Nut and bolt lock, R. M. Tuller 770,945
Nut lock, D. W. Martin 770,977
Nut lock, C. B. Fudge 771,139
Nut lock, McCutchen & Smith 771,167
Oat hulling process, D. W. Brown 770,794
Oil burner, fuel, J. A. Toomey 771,188
Ore separating apparatus, H. F. Campbell .. 770,796
Ore washing or concentrating machine, E. A. Wall 771,107

Orograph instrument, H. G. J. Stang 770,988
Packing, piston rod, H. P. Rhodes 770,926
Paper board, etc., means for drying, T. W. McFarland 770,772
Pasteurizer, cream ripener, churn, and butter worker, combined, D. W. Payne 770,779
Peat fiber for manufacturing half-stuff, apparatus for the treatment of, C. Esser. 771,202
Pencil, lead, C. W. Padan 770,777
Permanent way, J. C. Werckmeister 771,109
Pie marker, O. L. Weimar 771,192
Pipe coupling, automatic train, C. B. Dickerson 771,002
Piston rod extension, I. D. Morgan 771,023
Placket fastener, R. D. Slater 770,871
Plane, self oiling, J. Weyland 770,881
Planter, seed, Gould & Bow 771,060
Planters and drills, gage plate attachment for, D. R. Vivion 770,878
Plastic mold, F. D. Davis 770,846
Pneumatic despatch system, F. S. Smith 770,938
Pole changer, W. I. Thomson 771,188
Portable post, H. S. Gay 771,057
Post office box, W. & M. H. Folsom 770,747
Pot hanger and plant lifter, adjustable, H. C. Cheesman 770,738
Power transmitting device, variable speed, W. F. Howe 771,150
Pulley, C. Giraud 771,006
Pulley, sash, G. C. Gardner 770,849
Pump head, S. M. Fulton 771,005
Pumps, automatic controller for feed, R. J. Mullin 770,866
Punch, portable, J. H. Chidester 771,126
Punching bag attachment, K. C. Roe 770,869
Puzzle, E. G. Jackson 771,072
Rail clamp, J. F. Kelly 770,861
Rail joint, H. H. Wrench 770,996
Rail joint, C. O. Minor 771,622
Rail joint, H. Hines 771,148
Rail joint, F. C. Shelilto 771,180
Rail joint washer, elastic, Spiegel & Moehring 770,987
Rail system, third, L. M. La Barr 770,911
Railway, amusement, A. E. W. Frazer 771,056
Railway block signaling system, C. T. Morey 770,769
Railway crossing signal, E. W. Vogel 771,029
Railway rail spring, G. W. Smith 770,939
Railway signal circuits, E. W. Vogel 771,030
Railway signal system, W. A. Kibbe 770,757
Railway switch safety lock, F. C. Anderson 770,949
Railway third rail, electric, A. F. Chase 770,737
Railway tie, metallic, H. W. Avery 771,033 to 771,035
Railways, signaling system for electrically operated, Stillwell & Latey 771,027
Range finder, N. Tobin 770,833
Razor, safety, M. A. Mihills 770,767
Reclining chair, F. Grover 770,852
Refrigerator, portable, E. Johns 770,969
Registering lock, J. G. Ramey 771,092
Relay, J. C. Barclay 770,951
Road gate, automatic, H. Kirch 770,758
Roof framing tool, J. W. Morrison 770,770
Rotary engine, W. M. Byrd 770,890
Rotary engine, G. V. Anderson 771,113
Rotary engine, explosive, M. Beck 771,037
Rubber sponge cup, T. C. Marshall 770,914
Rule holder, W. O. Bell 770,953
Saddle, riding, L. A. Lohr 770,975
Safety hook, C. H. Terry 770,943
Safety switch, G. H. Hill 771,014
Saw attachment, band, E. L. Hayden 770,805
Saw mill, band, L. J. Hanhart 771,064
Sawing machine, O. L. Roberts 771,209
Scale, J. Hopkinson 770,807
Scale, A. U. Smith 771,213
Scale, computing, A. B. Hayden 770,804
Scale, price, L. T. Johnson 770,907
Scale, price indicating, I. C. Koehne, 770,809 770,810
Scale, spring balance, A. U. Smith 771,214
Seal, car, W. M. McIntosh 770,774
Seal, meter coupling, W. H. Larrabee 770,812
Separating, grading and polishing machine, Rowland & Longmore 770,781
Sewing machine feed mechanism, C. E. Hadley 771,010
Sewing machine, shoe, H. H. Duchesne 770,799
Sewing machine, shoe, E. E. Bean 771,200
Sewing machine slack thread controller, H. Manning 771,081
Sewing machine tuck accessory, F. Finlay 771,003
Shade fixture, window, C. A. Scheif 771,179
Sharpener, tool, D. W. Hattel 771,066
Sheet metal boxes or cans, making, Adriance & Calleson 770,948
Shoe, H. F. Rooney 770,822
Shoulder protector, H. Glover 771,007
Shovel, H. W. Avery 771,199
Shovels, making, H. W. Avery 771,032
Shutter fastener, A. B. Landis 771,078
Sieve cloth cleaner, W. Bonifield 770,734
Singeing pigs' feet, etc., apparatus for, N. A. Saxler 770,930
Sinks, lavatory basins, etc., in earthenware, machine for molding, R. Stanley 770,874
Sleigh, P. Fletcher 770,745
Snap fastener, ball, A. J. Bradley 770,955
Spectacle frame, I. Fox 771,054
Spectacles, H. Heeren 771,067
Speed mechanism, variable, W. D. Custead 771,046
Spinning machine, E. Gessner 771,059
Spinning ring, H. B. Hoyle 771,152
Spoon holding device, R. R. Pyle 770,925
Stacker, hay, F. J. Pavlik 770,980
Stacker, hood, pneumatic, Bechtel & Hagar. 771,118
Stamp, adjustable printing, A. J. Bradley 770,956
Steam engine, B. M. Schauman 770,985
Steam engine, O. F. Rodehaver 771,176
Steam generator regulator, automatic, I. T. Danks 770,893
Stone from magnesit, manufacturing artificial, C. Groyen 771,062
Stone sawing machine, J. B. Hanley 771,065
Stovepipe holder, C. B. Wassom 770,993
Straw feeding machine, G. P. Griffin 771,204
Suspender attachment, L. Selikowitz 771,212
Switch lever lock, N. Jamison 771,155
Switch locking device, M. P. J. Nemmert 770,818
Swivel joint, C. E. Fenstermacher 770,898
Table or counter cover attachment, A. A. Guardia 771,009
Telegraphing means, J. Beard 770,792
Telephone line switching mechanism, intercommunicating, Andriano & Herbstritt. 771,114
Thermostat, I. D. Gould 771,144
Thread cutting appliance, J. H. Tierney 770,944
Thread dressing machine, G. A. Fredenburgh 771,136
Ticket and automatic auditing system, combined, J. W. Lutz 770,814
Tire cover, pneumatic, C. B. Buxton 770,795
Tire guard, pneumatic, L. Vanderperre-Simon 771,190
Tire mold, C. G. Fawkes 770,896
Tire upsetting machine, wheel, L. F. Fairbanks 771,050
Tire valve, pneumatic, J. R. Keller, Jr. 771,156
Tire, vehicle, W. E. Andrew 770,791
Tobacco drier, B., C. & F. Duwel 770,742
Tool handle, H. O. Keferstein 770,970
Tool holder, J. Hunter 770,906
Toy, J. E. Zimmerman, ... 770,884
Toy, J. A. Swarts 771,187
Toy bank, A. Fonts 771,051
Toy bank, registering, G. B. Beale 771,117
Tracker bar, pneumatic, P. Wuest, Jr. 770,790
Traction device and emergency brake, electro-magnetic, C. A. Wells 771,193
Transfer, H. J. Berger 770,998
Treatment of material, apparatus for continuous, W. H. Gesner 771,141
Trolley, Fisher & Sanders 770,744
Trolley wheel controller, B. F. Jackson 771,206
Trolling spoon, R. C. Hornung 770,858
Trombone, J. Heald 771,012
Trousers protector, J. Lux 771,021
Truck and shovel, combined, F. Erickson 771,134
Truck, freight handler's, A. W. Cash 771,044
Truck, wheeled, C. A., Jr., & C. P. McQuirk, Sr. 770,773
Tube retainer, A. W. Plassmann 770,982
Tube welding machine, W. Byrd 771,129
Tubes, apparatus for the production of, Beck & Townsend 770,997
Tuning hammer, J. Erlandsen 770,981
Tunnel casing or lining, C. H. Dutton 770,894

Turbine, elastic fluid, W. J. Cartwright ... 770,736
Turbine engine, S. N. Smith ... 771,102
Turbine governing mechanism, J. Wilkinson. 770,995
Turbine, steam, S. N. Smith ... 771,103
Type writing machine, C. H. Shepard ... 770,933
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Type writing machine, W. A. Twining ... 770,990
Type writing machine, B. C. Stickney. 771,216, 771,217
Valve, J. Lally ... 770,811
Valve, air compressor, E. H. Steedman ... 770,783
Valve, automatic, E. L. Davis ... 770,845
Valve for explosive engines, feed, L. Anderson ... 770,731
Valve for steam engines, balanced, J. P. McDonough ... 771,168
Valve, relief, F. Schreidt ... 770,824
Valve reseating device, T. B. Williams ... 771,194
Valve, slide, J. B. Edwards ... 771,132
Varnishing, T. P. Anderson, Jr. ... 770,732
Vehicle, covered, H. M. Norris ... 770,775
Vehicle, motor, W. S. Simpson ... 770,936
Vehicle spring and coupling plate, S. E. Oviatt ... 770,776
Vehicle wheel, W. C. Potts ... 771,175
Vehicle wheel, compound, F. W. Oliver ... 771,171
Vending machine, coin operated, J. A. Rule. 770,928
Ventilating apparatus, W. C. Whetstone ... 770,947
Vessel hull, H. N. Whittelsey ... 770,838
Vise, C. H. Ritts ... 771,007
Vise, pipe, E. Henderer ... 771,147
Wagon brake, W. K. Melton ... 770,978
Wagon gear, P. Fletcher ... 770,746
Wall, retaining, W. L. Church ... 770,844
Washing machine, W. W. Terriff ... 770,989
Water closet bowl, Helfrich & Kingsbury ... 771,068
Water closet bowl, R. Schmalmack ... 771,098
Weeder, T. L. Brown ... 770,958
Weighing machine, automatic, R. Norton ... 771,170
Whip, M. O. Felker ... 770,897
Whip making machine, H. W. Larson ... 770,813
Window, O. M. Edwards ... 771,133
Window screen corner clamp, B. C. Rockwell 770,780
Wire stretcher, O. C. A. Schwien ... 771,099
Wire support, Bettmann & Zapp ... 770,999
Wire tightener, W. C. Julian ... 770,908
Wood carving machine, automatic, F. J. Widman ... 770,839
Wood shaping machine, F. P. Kelley ... 771,157
Wrench, R. F. Patman ... 770,921
Wrench, G. McKercher ... 771,169
Wrench, A. Wilson ... 771,195
X-ray tube, C. H. F. Muller ... 771,086
Yoke, neck, Byxbe & Callen ... 770,735
Yoke, neck, H. Peterson ... 771,173
Zinc white, manufacture of, J. Oettli ... 771,025

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Advertising card, A. Nederland ... 37,152
Seal press body, hand, Sigwalt & Willard ... 37,153
Type, font of, S. C. Gaunt ... 37,154

TRADE MARKS.

Antineuralgic, Farbenfabriken of Elberfeld Co. ... 43,416, 43,417
Belting, leather, Graton and Knight Manufacturing Co. ... 43,407
Beverage, certain named non-alcoholic, Nervola Co. ... 43,411
Brass or copper or alloys thereof, sheets and bars of, Taunton-New Bedford Copper Co. 43,423
Brushes, sash tool and sweeping, E. Clinton & Co. ... 43,426
Clay, certain named fire, T. S. McRath ... 43,422
Cleaning compound, certain named, G. M. Breinig ... 43,424
Creamy preparation for manicuring, E. B. Eldridge ... 43,414
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Extracts and syrups for use with beverages, A. G. Hulett ... 43,412
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Hosiery, M. & C. Mayer ... 43,405
Hypnotic, Raymond Chemical Co. ... 43,420
Jewelry, certain named, Goldsmith & Harsberg ... 43,403
Leather, Wolff Process Leather Co. ... 43,406
Medicine for appendicitis, Appendicine Medical Co. ... 43,415
Needles, certain named, H. Heusch & Cie ... 43,409
Patterns for cutting dresses, J. S. Bladworth 43,408
Pharmaceutical products, certain named, Chemische Fabrik auf Actien (vorm. E. Schering) ... 43,418
Pianos, Ivers & Pond Piano Co. ... 43,427
Plaster or plaster composition, wall, Georgia Wood Fibre Plaster Co. ... 43,425
Popcorn molded into blocks or cakes, Dishinger and Marks ... 43,410
Soaps, Obermeyer & Co., G. M. B. H. ... 43,413
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LABELS

"Egyptian Fortune Teller," (for cigars), M. Alishabon ... 11,422
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"Electric Cleansing Fluid," (for cleansing fluid), American Cleansing Fluid Co. ... 11,432
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"Flexo Chocolate bars," (for chocolate confectionery), National Licorice Co. ... 11,429
"Individual Liberty," (for hats), North American Hat Co. ... 11,430
"Smoker's Tooth Paste," (for tooth preserving compound), A. M. Pearson ... 11,425
"Smoker's Tooth Powder," (for tooth preserving compound), A. M. Pearson ... 11,426
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"Storm King," (for cigars), G. A. Waring ... 11,424
"T. M. Kildow's Half Spanish Cigars," (for cigars), T. M. Kildow Cigar Co. ... 11,421
"Union Made Garment Workers Knights of Labor," (for garments), Order of the Knights of Labor ... 11,431

PRINTS.

"At the Euchre—Wouldn't you like to hold my hand?" (for playing cards), United States Playing Card Co. ... 1,112
"Blue Ribbon," (for beer), A. von Cotzhausen 1,104
"Cu-rheuma Coupon," (for medicine), J. W. Carnahan ... 1,105
"Gameboard," (for game boards), W. B. Smith ... 1,111
"Golden Fleece," (for sheep leathers), E. S. Gile ... 1,113
"Herba-Vita Coupon," (for medicine), J. W. Carnahan ... 1,108
"Nervo Laxi Coupon," (for medicine), J. W. Carnahan ... 1,107
"Regitonic Coupon," (for medicine), J. W. Carnahan ... 1,106
"Sapplin Stove Pipe Enamel," (for stovepipe enamel), Gerstendorfer Bros ... 1,114
"The Tom Thumb Wedding," (for medicine), J. W. Carnahan ... 1,110
"Tom Thumb Cabinet," (for medicine), J. W. Carnahan ... 1,109

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